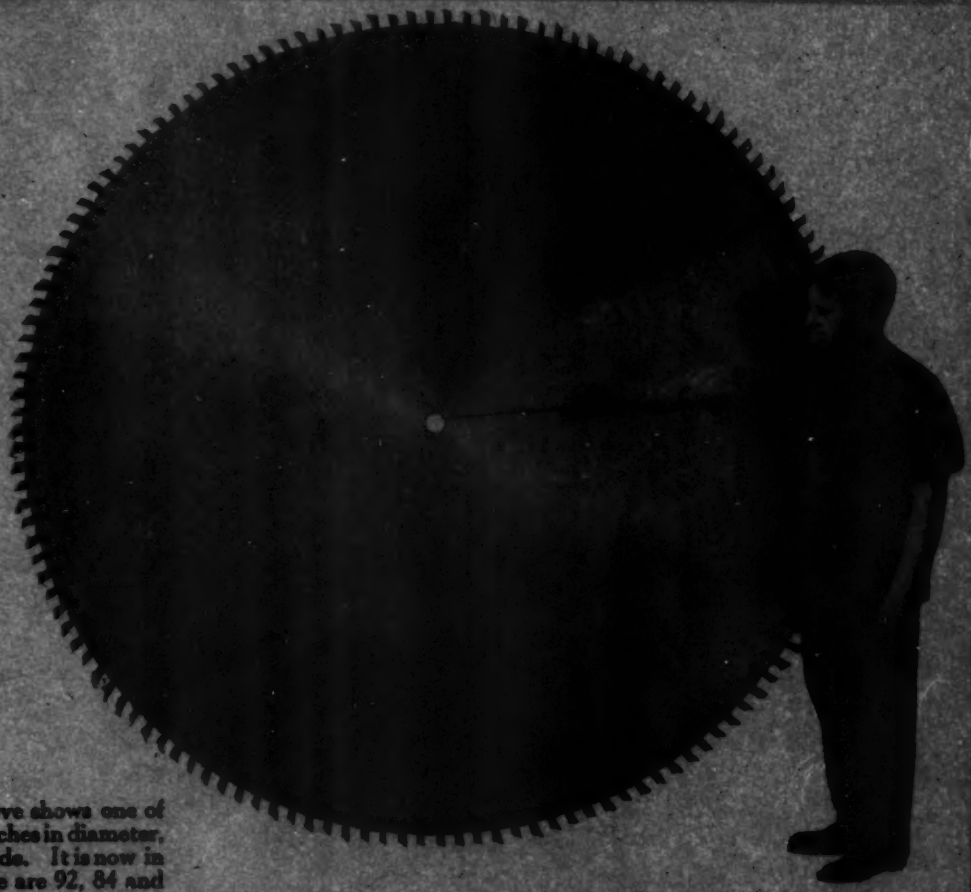
Vol. I SEPTEMBER, 1919 No. 6

THE PAPER INDUSTRY

The Monthly Educational Journal of the Paper Industry.

RECEIVED JUN 4 - 1920

Pulp Mills Find Economy in the use of SIMONDS Inserted-Tooth Cut-Off SAWS



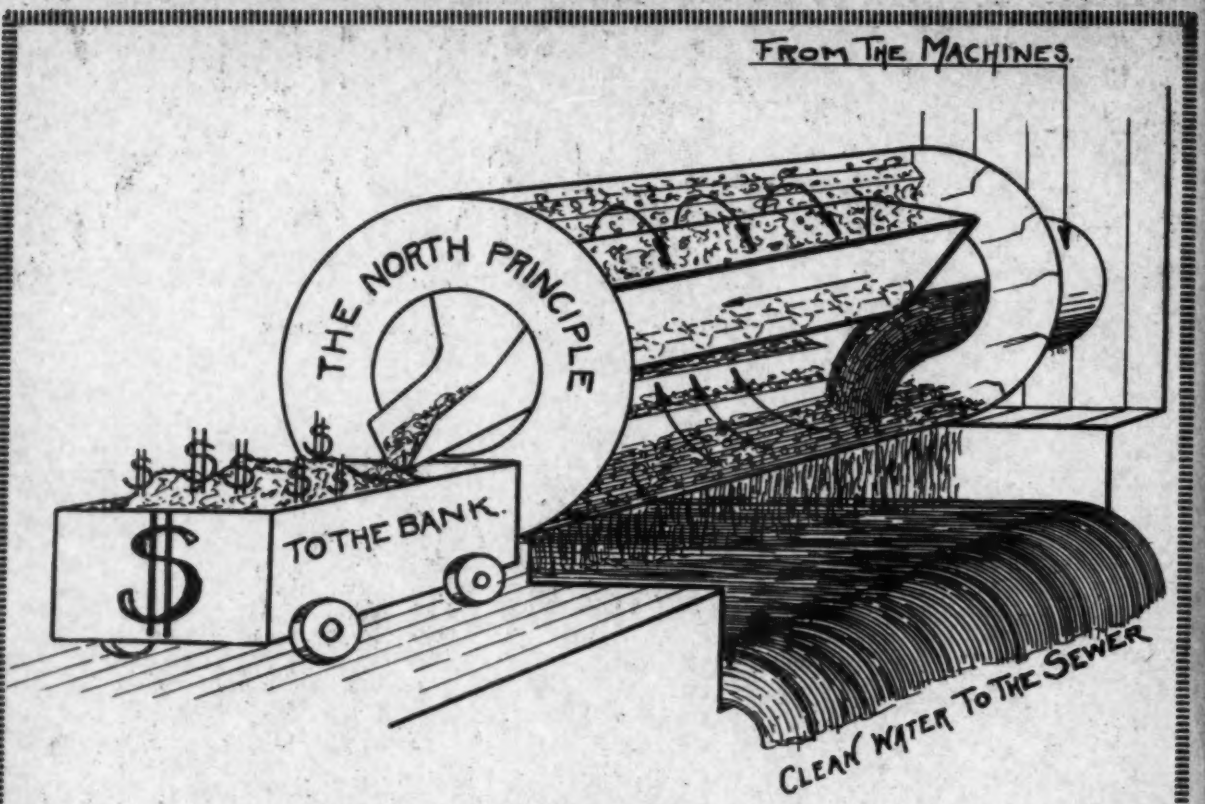
THE picture above shows one of these saws 96 inches in diameter, the largest ever made. It is now in use. Others in use are 92, 84 and 72 inches. Pulp Mills use many of them 60 inches in diameter, which is a good size for you to consider. Let us quote prices and tell you the construction details of this cut-off saw. One feature which puts the Simonds Saws ahead of others is the quality of the cutting teeth and the way they stay in the plate at cutting speeds. This new cut-off saw is a safe, economical, and wonderfully efficient saw.

Write our nearest office about an equipment for your mill

SIMONDS MANUFACTURING COMPANY

"The Saw Makers" FITCHBURG, MASS. *Established 1832*

CHICAGO, ILL. PORTLAND, ORE. NEW ORLEANS, LA. SAN FRANCISCO, CAL.
MONTREAL, QUE. MEMPHIS, TENN. SEATTLE, WASH. ST. JOHN, N. B.



The North Save-All

A horse-sense, simple machine, saved stock either six percent dry or wet to pump. Horse-power is one only. No excess up-keep. No leaks. We make a special inlet machine so you can place it on your machine floor. No pumping. The only one that can do this. We think we know your conditions. ***Sent on trial.***

The North Water Filter

Three sizes, Five, Seven and Ten Million Gallons in Twenty-four Hours. One Horse-power. Sent on Trial. You Can't Sell Dirty Paper Now.

The Scott Shredder

Eight Horse-power. Three Thousand Pounds per Hour. No Upkeep.

The North Pulp Washer

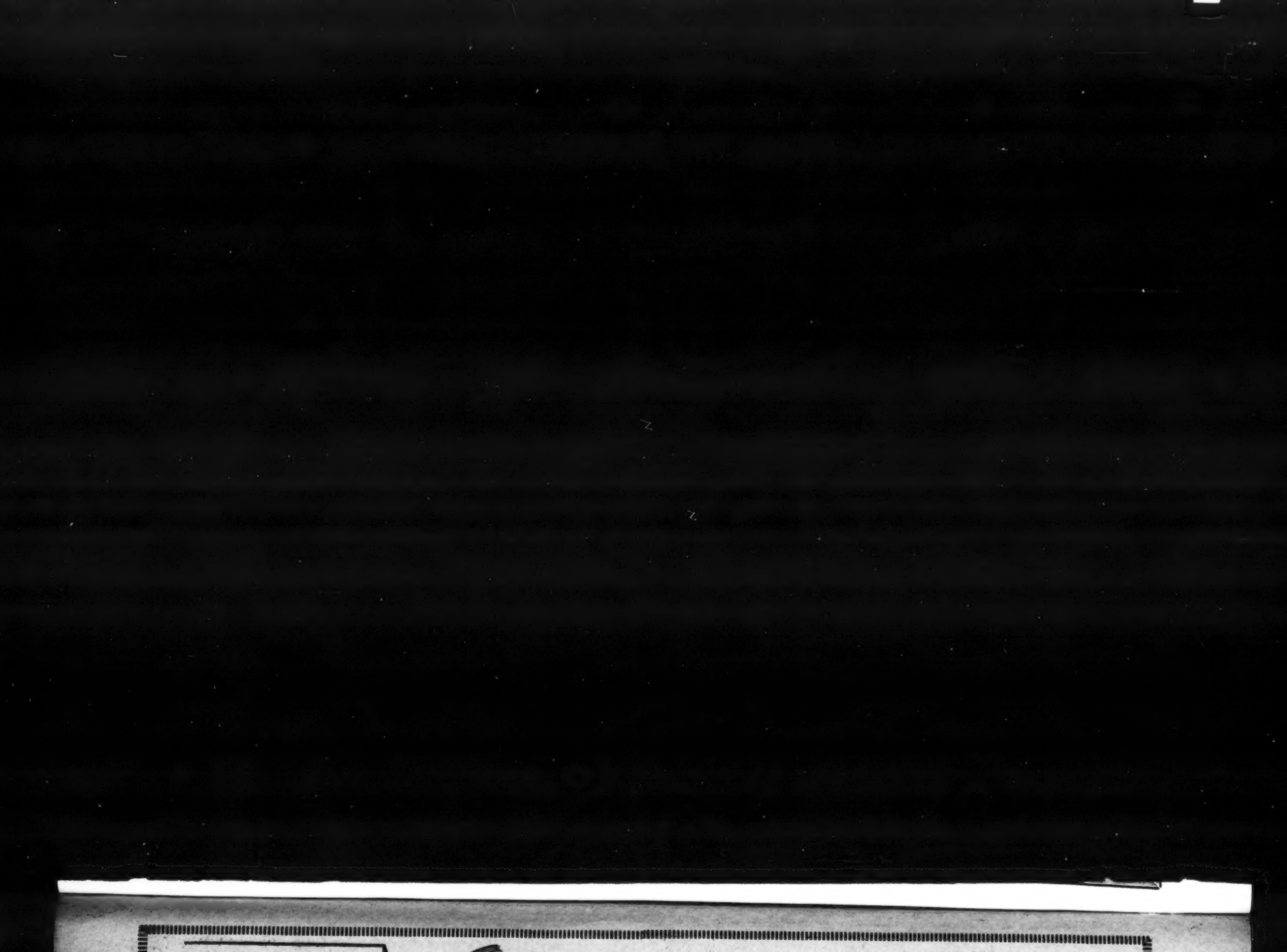
Four Horse Power. Eighteen Ton per Day. Continuous. Clean Pulp Will Sell Paper.

The Stub End

A Monthly Curse to Any Paper Maker. Read It.

The Green Bay Foundry & Machine Works

GREEN BAY, WISCONSIN



6

Office and Works, North Philadelphia Station, P. R. R., Philadelphia, U. S. A.

ESTABLISHED 1885 THE INCORPORATED 1903

MOORE & WHITE CO.

PHILADELPHIA, U. S. A.

Engineers—Founders—Machinists

BUILDERS of Paper Machines for all grades of Paper—all grades of Box Boards—Roofing Felt and Building Papers—Saturating and Asphalt Coating Machinery.

MANUFACTURERS OF THE FOLLOWING PATENTED SPECIALTIES

"M. & W." Super Calender Winder
"M. & W." Paper Cutters—single, duplex and diagonal
"M. & W." Lay Boys—single, duplex and diagonal
"M. & W." Finishing Room Trucks
"M. & W." Sorting Tables
"M. & W." 2 and 4 Drum Winders and Slitters
"M. & W." Wire Guides — single and double fenders
"M. & W." Improved Suspension Shake
"M. & W." Friction Clutches—high speed and standard
"M. & W." Speed Changes
"M. & W." Rotary Screens—single and double
"M. & W." Table Roll Bearings
"M. & W." Upright and Revolving Reels
Hoffman Couch Rolls
Bellmer's Bleaching Process
Pulp Thickeners and Worm Washers
Farnham Cylinder Drive
Pumps—Stuff, Suction and Centrifugal
Eckenroth's Log Splitter
Füllner Filter Save-All
"M. & W." Wood Suction Box Covers
Agitators and Stuff Chests
Cylinder, Railroad and Devil Dusters

Information and Bulletins on any of the above subjects will be sent upon request

Inquiries solicited and given prompt and careful attention.

Specifications and estimates for paper and pulp machinery on either new or repair work cheerfully given.

QUALITY GUARANTEED STRICTLY HIGH-GRADE

Vol. 1—No. 6

THE PAPER INDUSTRY

PETER J. MASSEY
Editor

A MONTHLY EDUCATIONAL JOURNAL
Devoted to the Interests of The Paper Industry

CONTENTS

FOR SEPTEMBER, 1919

		Page
Contents Page		404
With the Publisher		411
Editorial		413
The Paper Market As Is		415
Don't Quit Before You Start	*Anonymous*	418
The Value of Waste Paper Stock in Papermaking	*Ed. T. A. Coughlin, B. S. Ch. E.*	419
Increased Production Thru Correct Lubrication	*A. H. Pritchard*	424
Mechanical Handling of Storage Pulpwood	*M. W. Hibbard*	428
The Analysis of Water	*R. E. Davis, B. Sc.*	432
Difficulties Encountered in Printing Paper	*Peter J. Massey*	434
Care of Electrical Apparatus in Pulp and Paper Mills	*W. W. Cronkhite*	438
The Handling of Size and Alum Solutions	*E. G. Milham, Ch. E.*	440
A Study of Various Types of Belting	*E. D. Wilson, B. S., Ph. D.*	443
Are You Oiling the Safety Movement?	*Al Kroes*	446
Problems of Emloyment Managers	*Anonymous*	448
Progress in Paper Drying	*Arthur G. Maury*	450
Superintendents' News		452
Chips of Information		454 to 463
T. A. P. P. I. Meeting at Chicago		453
Commercial Outlook		465
Domestic Raw Materials		467
Current Quotations		471
Import and Export Markets		475
Buyers' Guide		479
Alphabetical Index to Advertisers		481

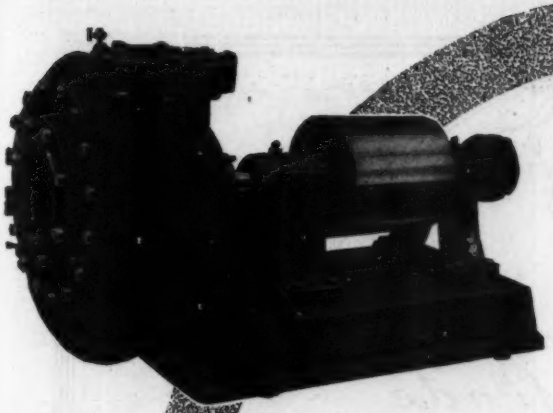
TERMS: To U. S., Alaska, Hawaii, Philippines, Porto Rico, Cuba and Mexico the subscription price is $2.00 per year. Canada, $2.50. Other countries, $3.00.

Copyright 1919, *by*

EDWARD B. FRITZ, Publisher

501 Monadnock Block Tel. Wabash 7327 Chicago, Ill., U. S. A.

Eastern Office: Room 1411-1412, 150 Nassau Street, New York City



"Buffalo" Paper Pump

Designed and Built to Eliminate Clogging

Buffalo Paper Makers' Pumps are designed to meet the requirements of the paper manufacturer—for handling ground wood stock.

They are in successful use in the largest paper mills in the country for handling ground wood pulp.

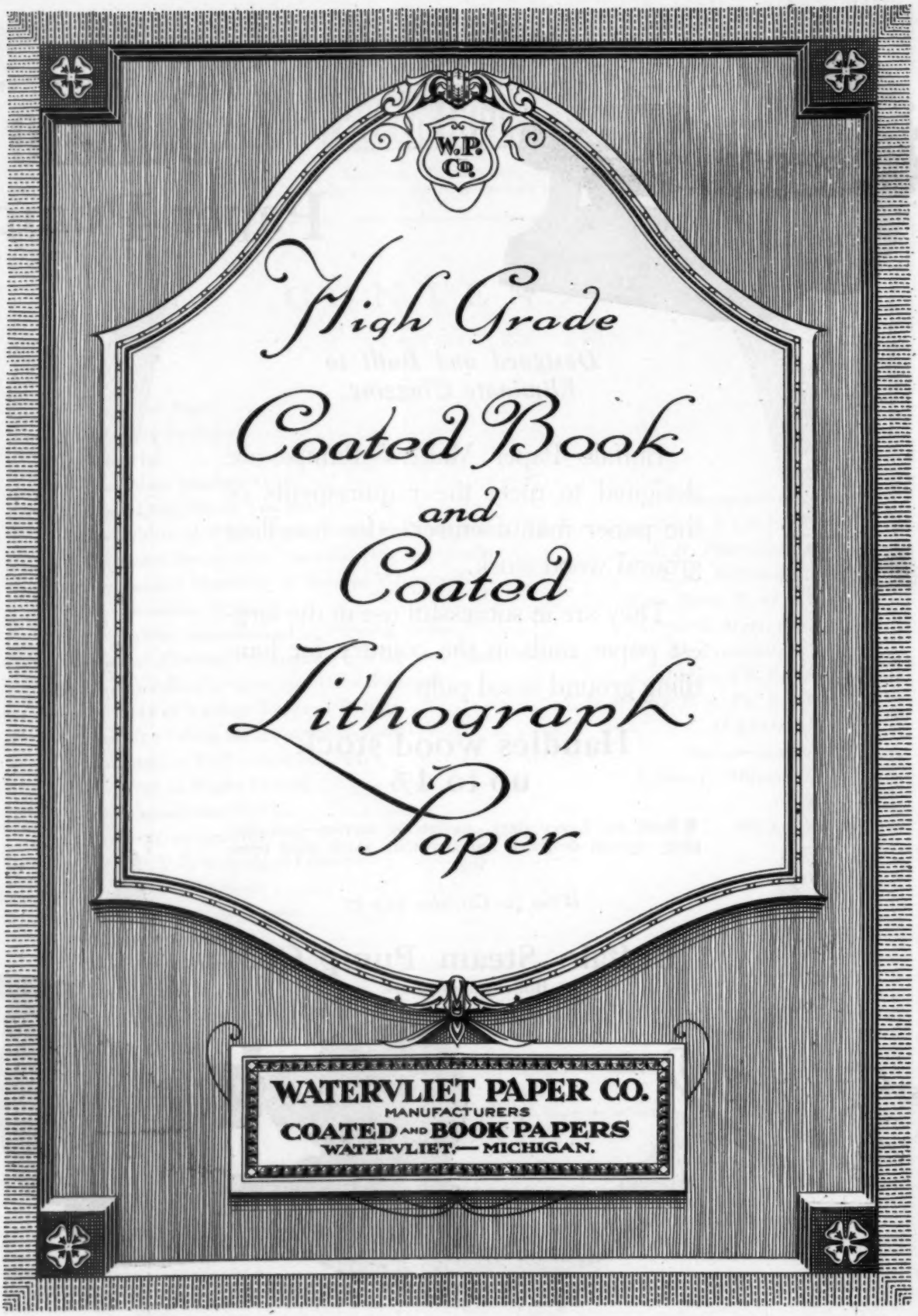
Handles wood stock up to 4%

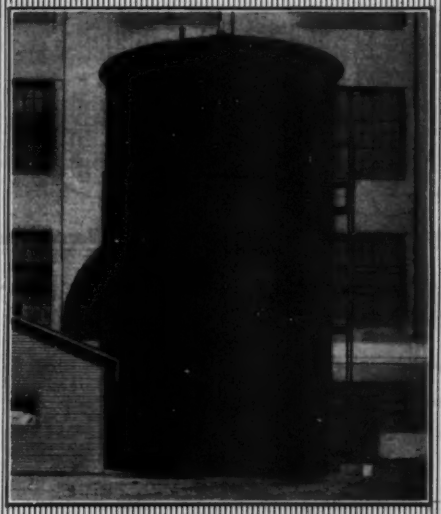
¶ Built for heavy duty continuous service—non-clogging—special designed impeller with extra wide openings.

Write for Circular 953-27

Buffalo Steam Pump Co.
Buffalo, New York

"Buffalo"


W.P. Co.
High Grade
Coated Book
and
Coated
Lithograph
Paper
WATERVLIET PAPER CO.
MANUFACTURERS
COATED AND BOOK PAPERS
WATERVLIET,— MICHIGAN.



Softening Tank

IMAGINE that the Graver Water Softener shown here was installed at your plant. If it were, you could produce a better grade of paper at less expense, have uniform water the year 'round for all mill purposes and pay out in dividends money now wasted in unnecessary coal consumption, frequent boiler repairs and wire renewals, and in wasted dye and sizing.

Ask us to prove this. No obligation, no expense.

Wm. Graver Tank Works

Tanks and Steel Plate Products,
Water Softeners and Filters.

EAST CHICAGO INDIANA

Mixing Tank

PAPERS

For

Books :: Catalogs
Broadsides Flyers
Folders & Circulars

Liberty	Coated Book	Equator	Offset
Crystal	" "	Meridian	"
Elite	" "	Silverleaf	Coated Bond
Velvet	" "	Opacity,	English Finish
Ultimate	" "	Opacity,	Super "
Radium	" "	Light Weight	Catalog

Competent Selling Organization in all Important Printing Centers

Mills from Maine to Minnesota. Complete Stocks for Immediate Shipment

Send for Samples and Prices

SEAMAN PAPER COMPANY
Paper Manufacturers
CHICAGO
208 So. LaSalle St.
NEW YORK
200 Fifth Avenue
St. Louis Minneapolis Milwaukee Buffalo
St. Paul Philadelphia Cincinnati

DU PONT AMERICAN INDUSTRIES

DU PONT DYESTUFFS

Du Pont American Dyestuffs

for TEXTILES, PAPER, PAINTS, LEATHER *and* PRINTING INKS

The Du Pont oval stands for over a century's experience in the manufacture of products with the prestige of leadership in every chosen field. It is your guarantee of the excellence and dependability of Du Pont American Dyestuffs.

E. I. du Pont de Nemours & Co.
Dyestuffs Sales Dept.
Wilmington .·. Delaware

Branch Offices:
New York Boston Providence
Philadelphia Chicago
Charlotte, N. C.

DU PONT

¶ Magnify it as much as you like.

¶ Make any test you wish.

¶ Examine the warp and the woof.

¶ Run it on your machine and you will always find that

"Appleton Wires are Good Wires"

APPLETON WIRE WORKS

Appleton, Wis.

With The Publisher

IT has recently come to our notice that a certain publisher has been traveling around and making unpleasant comments about the American Pulp and Paper Mill Superintendents' Association. He is quoted as having said on many occasions that this association was a union. If this man had the average amount of intelligence he would know that the superintendent of a paper or pulp mill is part of the management. Again it would be as impossible to unionize the superintendents of the pulp and paper mills as it would be to do the same with the managers or owners of the mills. It would be impossible to form a union with only one or two men in a plant.

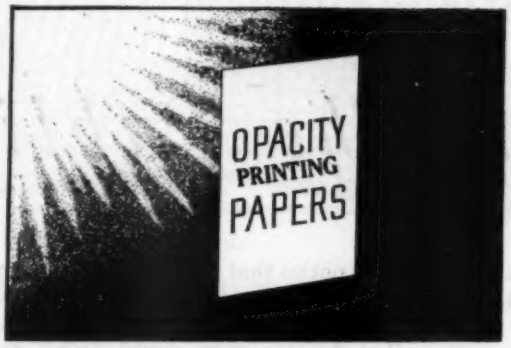
The only reason that we take any notice of this is that some owner or manager might get the same idea, and we want to assure any such person that it would not only be impossible to form a union of the superintendents, but that the idea of this association is for the betterment of the whole paper industry.

Just before the recent meeting of superintendents at Green Bay it seemed that one or two of the managers in Wisconsin thought it was not a good idea for these men to get together. One man in particular seemed antagonistic. He was invited to the meetings at Green Bay, and before the meetings were over he not only paid the dues for his two superintendents, but contributed liberally to the expenses and was one of the boys. He learned, as have all other managers that have taken the time to look into this matter carefully, that it is the best move ever made in the paper industry to get the superintendents together, so that they may know one another, rub elbows together, and talk over the various problems that confront all of them alike.

At a recent meeting in Kalamazoo nearly all of the managers of that section were at the last meeting. One manager came quite a distance to "see what was going on," as he said, and he went away satisfied and later sent in an application for his superintendent, along with payment for the first year's dues.

All of the meetings of this association, outside of the regular business meetings, are open to anyone interested, and managers or owners are welcomed, for they all can learn something from the talks by the superintendents and others that are called in to address them.

The first big meeting of this association will be held at the Congress Hotel, Chicago, November 6th and 7th, and we are sure it will be profitable for every superintendent in America to be there, as well as the managers and owners of paper and pulp mills who are desirous of learning how to be better paper makers.



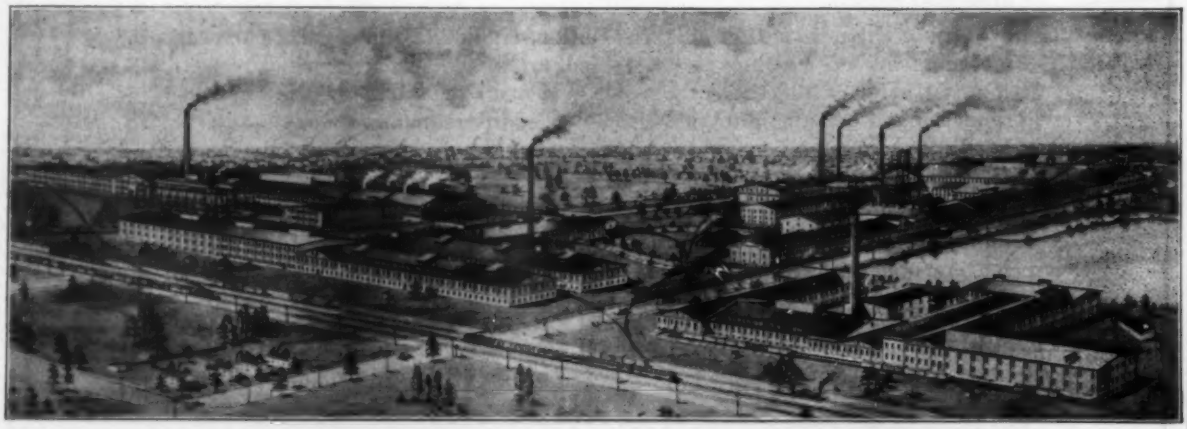
BRYANT

PAPER COMPANY

Kalamazoo, U. S. A.

World's Largest Manufacturers of

Opacity Book and Catalog Papers



PLANTS OF THE BRYANT PAPER CO., KALAMAZOO, MICH.

EDITORIAL

LACK of Confidence between capital and labor is the real cause of the industrial unrest. It is not a new social phenomenon, nor is it caused by any psychological reaction from the World's War.

This lack of confidence existed before the war, patriotism and war emergency measures succeeded in smothering the unrest during the war period, but the flame was not extinguished, only temporarily subdued. As soon as the restraint was removed, the smoldering embers broke out into flame, until now this conflagration has assumed such serious proportions that it actually threatens the industrial peace of the entire country.

The mis-Leaders of labor are taking full advantage of this lack of confidence and labor's strong position at this time, by calling reckless strikes all over the country; wantonly squandering our most valuable asset—Productive Labor.

Placing all the responsibility on the shoulders of labor and politics is only condemning the effect and condoning the cause. The reactionary manager, who believes that the more ignorant his men are, the better off he is, and rules with the severity of a Bourbon Prince, is one of the principal causes for unrest. He is the type that has caused the loss of Confidence and does not know that royalty now is persona non grata.

The manager who does not believe that his employees are entitled to see both sides of the question is the principal cause of the present state of unrest, and deserves no sympathy when his plant is plunged into the troubles of industrial strife. He personally is to blame for losing the confidence of his employees and making them an easy prey for the professional agitator, who knows only too well how to make the most of an opportunity to supply the men with his idea of both sides of the story.

There may be some particular cases where the management's position is defensible. But obviously it must be that either the methods used were wrong or the work was delegated to some person who had neither sufficient training, nor tact for this very important work.

Professional agitators are not chosen indiscriminately for any work they are to perform, nor because they are not fitted for any other class of work. They are men who have given your particular industry considerable study, somewhat above the average intelligence, good judges of human nature, have a thorough knowledge of mass psychology, and in many instances are as fervid fanatics as any Moro that ever run amuck.

You cannot possibly expect your employees to be otherwise than impressed when these men lay their side of the case before them—the only side, by the way, with which some workers have been permitted to become acquainted—and presents the management's side of the case from his point of view. You can rest assured he will not extol the management's virtues. The only good features he will mention about the management will be those to which he can attribute sinister motives.

The only stabilizing influence that is being brought to bear on the situation and is keeping the conflagration within due bounds is being exerted by the comparatively small percentage of managers of industrial enterprises that have seen the handwriting on the wall and have worked consistently to gain the confidence of their employees, by assisting them to acquire the point of view of the management, in addition to the employee's point of view.

These men are not raving about radical labor dictators; they are removing the possibilities of "easy graft" for all labor mis-leaders, by creating an organization which can judge the case and make decisions with all the evidence before them.

Let us all apply the fundamentals of Justice to our industry by giving every person engaged therein an opportunity to know both sides of the labor question as it applies to his own individual case, then let him make his choice. We will then have industrial peace resting upon the strong foundation of Mutual Confidence.

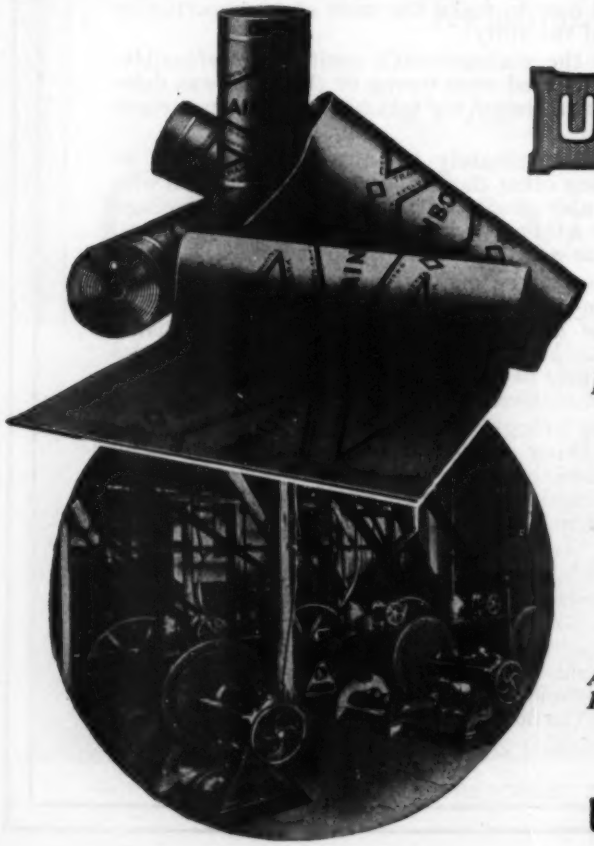
MUNISING PAPER COMPANY

MUNISING MICHIGAN

MANUFACTURERS OF

MUNISING M BOND

COLOR QUALITY AND UNIFORMITY
HAVE MADE FOR IT
AN ENVIABLE REPUTATION



US United States Packings

Rainbow Packing
means
Pipe Line Insurance

Because:—

It is as reliable as the metal part of the equipment.

It will remain flexible in the joint, thus taking care of expansion and contraction.

It will not soften or ooze out under high pressure of severe strain.

You can safely specify it for steam temperatures up to 370 degrees.

Where durability is demanded it will render unfailing service and sustained economy.

All Rainbow Sheet is Red, but all red sheet is not Rainbow. Don't experiment—use Rainbow:

"The Right Packing in the Right Place"

United States Rubber Company

The Paper Market as Is

FROM every point of view the paper market is in a stronger position at present than in many a day. Demand from consuming and jobbing sources is exceedingly keen, and, at the same time, of a most healthy character. Buyers are placing orders in an almost reckless manner, their single idea apparently being to cover requirements for a time in the fear that if they delay until their needs actually develop they may not be able to obtain supplies of paper quick enough to fill their wants. Merchants in turn are exerting every effort to place some lots of paper on their stock shelves, so that in the event supplies become pinched to the point where deliveries cannot be secured within a reasonable length of time, they will be in a position to at least satisfy a portion of their customers' wants.

With the point in the year when the customary autumn stimulation of the paper trade occurs still in the future, despite which mills are being literally overwhelmed with orders, members of the industry are wondering what the fall season is likely to bring forth. It can safely be said that last month was the busiest August paper manufacturers in the United States ever experienced. Rather than being the dullest month of the year, as it usually is, it proved to be by far the most active the industry has passed through in 1919, and without any question the liveliest of any August in years gone by.

September thus far bids fair to exceed even last month in point of business volume. Demand has reached that stage where it can correctly be termed "acute." The great majority of mills, having sold virtually their entire production for several months to come, display decided reluctance to enter into further commitments, and buyers as a result are encountering considerable difficulty in placing orders. It is stated by authoritative members of the manufacturing branch of the industry that should demand suddenly come to a total halt, the mills of the country could be kept operating at maximum capacity for at least two full months on the unfilled orders they now have on their books.

Augmenting the brisk demand from domestic consuming and distributing sources is a very active inquiry for paper of various kinds from export circles. South American countries, Japan and some European nations are anxiously seeking supplies in America, and there is no question that if manufacturers were in a position to take advantage of the voluminous demand from foreign sources, they could transact a far larger trade than they are in this direction. As conditions shape up, however, the average paper mill in the United State today is so busily engaged in trying to fill the requirements of regular customers, that they have very little of their product to divert to export channels. In fact, the wish has been expressed by some manufacturers that demand from domestic consumers would ease up to a sufficient extent to permit them to build up markets in foreign climes in a more comprehensive way than they thus far have done.

Prices on all grades of paper are firm, as would be expected with the conditions outlined above obtaining, and appreciable advances are being scored from time to time. Probably the sharpest rise in prices during the past month has been that in news print prices. Spot lots of print paper in rolls have sold at 5.50 cents a pound at the producing mill, and rumors have been heard of sales at even higher levels. Fine papers are quotably strong and gradually, but steadily moving upward in value. Book papers are exceedingly firm in price and are sought in an active and voluminous manner. Wrappings and tissues are firm in price, while boards of all kinds have again advanced.

Northern Paper Mills

"The Standard of Excellence"

"Northern" Toilet Papers

"Northern" Inter-Folded Towels

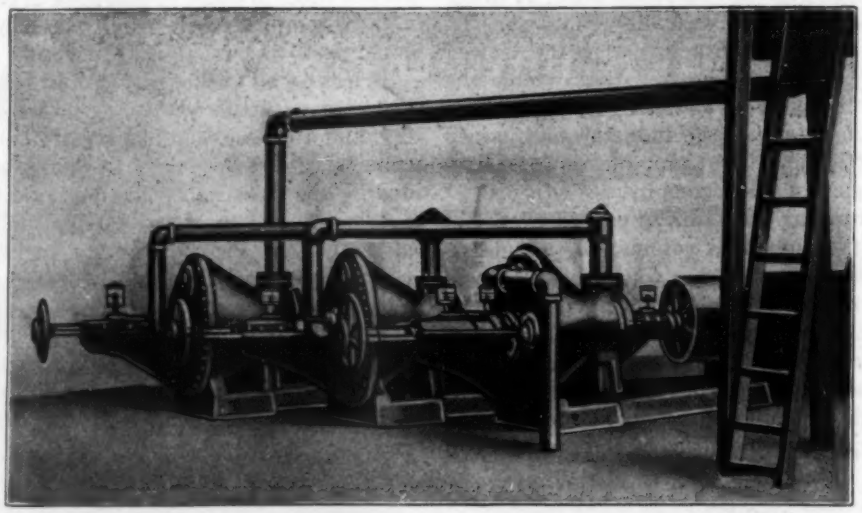
"Northern" Roll Towels

CAPACITY 100,000 LBS. PER DAY

NORTHERN PAPER MILLS, GREEN BAY, WIS.

CLAFLIN CONTINUOUS BEATERS

They Save Power Floor Space Labor and Upkeep



They Can't Be Beat For Stuff That's Hard To Beat

¶ The Saving in Power is due to the fact that a continuous stream of stock as large as will pass through a four or five inch pipe is being treated, eliminating the power required to keep a large mass of Pulp and Water in motion as in a Tub Beater.

¶ Only one-fourth the Floor Space is required for this type of Beater.

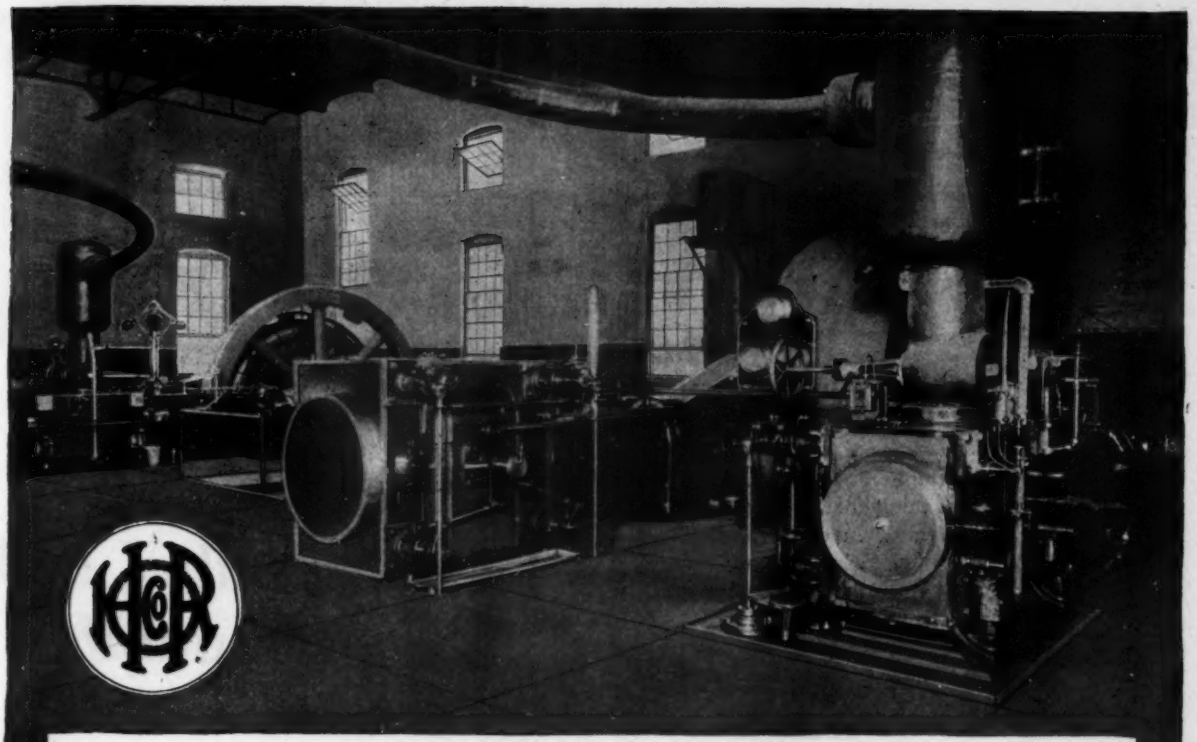
¶ The Claflin Beaters are quickly and easily refilled and any mechanic can do the work. The life of the knives is much longer than any other type of Beater.

Write us for information.

CLAFLIN ENGINEERING CO.

THE CANADIAN FAIRBANKS-MORSE COMPANY, Ltd. - - - - *Agents for Canada.*

Lancaster, Ohio



Cross-Compound "Hamilton" Engine in Federal Strawboard Co., Alton, Ill.

Paper Mill Engines

There is a Hamilton Engine built for every Paper Mill's needs—operating more efficiently and economically than any other prime mover—representing the last word in Scientific Engine-Building.

All the resources of the organization that produced for the United States Shipping Board, four complete 2800 horse-power Marine Engines, in a single week, are today devoted to building Hamilton Engines, suited to the exacting requirements of each industry.

Let us demonstrate to your engineers what we can do to solve your power problem.

Offices in All Important Cities

The Hooven, Owens, Rentschler Company

Producers of Prime-Movers for All Industries

Hamilton, Ohio

HAMILTON

POWER EQUIPMENT

Don't Quit Before You Start

IF you think you are beaten, you are;
If you think that you dare not, you don't;
If you think you'd like to win, but you think you can't,
It's almost a "cinch" you won't;
If you think you'll lose, you've lost;
For out in the world you find
Success begins with a fellow's will—
It's all in the state of mind.

FULL many a race is lost
Ere even a step is run,
And many a coward fails
Ere even his work's begun.
Think big, and your deeds will grow;
Think small, and you'll fall behind;
Think that you can and you will—
It's all in the state of mind.

IF you think you're outclassed, you are;
You've got to think high to rise;
You've got to be sure of yourself before
You can ever win a prize.
Life's battles don't always go
To the stronger or faster man;
But soon or late the man who wins
Is the fellow who thinks he can.

—Anonymous

THE PAPER INDUSTRY

"The Educational Magazine for the Paper Industry"

Volume I SEPTEMBER, 1919 Number 6

The Value of Waste Paper Stock in the Manufacture of New Book Papers

By EDWARD T. A. COUGHLIN, B.S., CH., E.

Part II—Mill Sorting of Old Papers

THE general plan, or layout, of old paper sorting rooms is practically the same in all mills. It is always placed at the farthest end of the mill and usually on the top floor, so that gravity delivery is given to the papers to the cooking or "Bleacher" room; and also affords a continuance in the progressive steps in the manufacture. A glance at the blue print, No. 1, of the plan of the entire mill will readily make clear the value of this point.

The sorting room itself must be well lighted and ventilated. Light is essential for close sorting, and the dust-laden air must be continuously removed to make the work healthful for the sorters.

The sorting benches are arranged around the sides of the entire room, allowing a space in the center for convenient handling of the baled waste. Photographs No. 1 and No. 2 shows clearly this arrangement. A coarse mesh screen is built in the bottom of these benches and serves to screen loose dirt, pins, and other foreign pieces of debris from the papers.

When the waste papers reach the mill, they are weighed-in by the storehouse foreman and the weight written on a tag and fastened securely to the bale. If there is room for this stock, it is sent up on the elevator to the sorting room and is placed at the benches. If the sorting room is well supplied, the car is unloaded and placed in the storehouse in the numbered bays. The storehouse foreman is well qualified to judge the quality of the stock as he receives it. If, in his mind, it will run excessively in print or discards making it too costly to sort, he will hold up the unloading till he is further advised by the purchasing agent or sorting room foreman. In this way, considerable expensive sorting is avoided and helps the efficiency of the sorters.

On receiving the bale of papers, the sorter removes the tag and carefully retains it; for it represents what the bale weighs and, consequently, her pay for this bale, when it is sorted, at the rate of fifteen cents a hundred pounds. Her accustomed eye tells at once how this paper will sort. She can pick out "ground wood" or mechanical pulp sheets, which are termed "print," by the general appearance of the paper if it is old—the yellowish color at once betrays "print." Occasionally she will sprinkle over the paper on the bench with a solution of aniline sulfate. (The strength of the solution is one-half pound of ordinary sulfate to five gallons of soft water.) This test is widely known, and when the price of the sulfate is normal, is used extensively. If any of the papers turn yellow they are discarded as "print" at once. This test is rather slow with the above strength and for a more rapid test nitric acid is used to identify print. This is made up with equal parts of acid and water. As an indicator this solution is almost instantaneous in its action, giving the dark brown color for "print."

A further rapid test, which has quite an extensive use, is prepared by making a strong solution of caustic soda or soda ash. This also gives a yellow or brown coloration for print.

However, when aniline sulfate is not to be obtained, and when the nitric acid test is not a positive test, inasmuch as unbleached sulfite gives a brown

color reaction also, the sorter must call the attention of the foreman, or his assistant, the floorman. His long experience in this work enables him to judge the paper in question merely by looking at it or thru it, tearing it, or trying the acid test himself. If there is any doubt at all in his mind, the paper is discarded, for, as mentioned before in the introduction, ground wood or mechanical pulp will cause no end of trouble later in trying to make a clean sheet of paper.

When a bale is opened, and an attempt is made to sort it, if it is seen that it will require close sorting in order to properly remove all the print and discards, the sorter is required to sort by the day. In this way she is able to earn a fair wage, which amounts to $2.65. Otherwise, by sorting at the rate of fifteen cents a hundred pounds she would hardly sort 700-800 lbs.

The quantity sorted per day and the cost of sorting depends directly upon the quality and the grade of papers as received. The grades of waste papers used chiefly in book paper mills are as follows: magazine, book, overissues, unstitched, lithograph, ledger writing, and solid ledger, and perhaps some shavings. Solid magazines are easily sorted. After removing the print magazines, the names of which are well known to the experienced sorter, the deep color covers of the good magazines are torn off and placed in a container for this kind of discard. Solid school book is also easily sorted, requiring only tearing the book backs off and dividing up the book into two or three parts. Overissues do not require sorting for they run uniform. These are fed direct to the conveyor to the duster. The same is true of lithograph and unstitched, providing they are not received in sheets too large for the dusters to handle. Solid ledger needs only to have the binding torn and the paper separated into a suitable thickness about ½ to ¾ of an inch. No. 1 hard and soft shavings seldom require sorting. On the above grades each sorter can handle from 2800-4000 pounds in ten hours, depending upon her own dexterity and speed. With these grades the cost of sorting is at its minimum, i. e., fifteen cents per hundred pounds.

However, mills are not so fortunate as to receive such fine packings; they only come in occasional lots. The usual run of papers is No. 2 book and magazine and mixed ledger. In these grades, which are supposed to have been graded with due care by the packers, we may find all sorts of paper. This must all be handled separately, so that the amount sorted by each sorter, will vary from 1300-2500 pounds, averaging usually about 2000 pounds in ten hours.

The mixed ledger grade causes the greatest difficulty and is usually sorted by the day at $2.65. Five or six sorters are employed constantly on this class of stock, in order to provide a supply on hand when necessity demands an immediate cooking of 30,000 or 40,000 pounds. Obviously this amount could never be sorted at a normal cost within short notice.

The first shrinkage in the treatment of old waste paper occurs with the sorters' discards. All the discards are classified as follows: print, colors, bagging, carpets, wrappers, tobacco paper, wire and rope.

For a period of a year these different discards have been figured out on a percentage basis:

Year 1916	Total Paper Sorted	Total Discards	Per cent Discards consist of the following: Discards	Print	Colors	Backs	Bagging, Etc.
Yearly Totals	13,273,076	881,423	6.64%	4.11%	1.45%	0.25%	0.83%
Daily Average	45,690	3,034	6.64%	1874#	665#	114#	381#
Monthly Average	1,106,089	73,452	6.64%	45367#	16090#	2772#	9222#

From the above figures, which were compiled from daily records, the total percentage of discards amounts to 6.64%. This is the first direct shrinkage in handling old waste paper stock; as supplied by the general trade. A glance shows that 4.11%, or more than 60%, of this shrinkage is due to "print" or ground wood discards. By the use of better graded or selected stock, such as straight overissue magazines of standard quality, this shrinkage can be greatly reduced.

The gross weight of paper handled in 1916 amounted to 13,273,076 pounds. This tonnage has been distributed according to grades and the percentage and average daily and monthly weights of each grade is displayed in the following summary:

CLASSIFICATION AND DIVISION OF PAPER STOCK USED.

1916	Magazines	Book	Light Book	Over-Issues	Litho-graph	Stitch-less	Ledger	Solid Ledger	Grand Total	Working Days
	10,753,042#	780,551#	188,634#	35,947#	106,495#	438,189#	862,102#	108,006#	13,273,076#	290.5
Daily Average	37,016#	2,687#	649#	123#	367#	1,508#	2,968#	372#	45,690#	.....
Monthly Average	896,087#	65,055#	15,720#	2,995#	8,875#	36,515#	71,842#	9,000#	1,106,089#	.....
Percentage of each grade	81.02%	5.88%	1.42%	0.27%	0.80%	3.30%	6.50%	0.81%	100.00%	.....

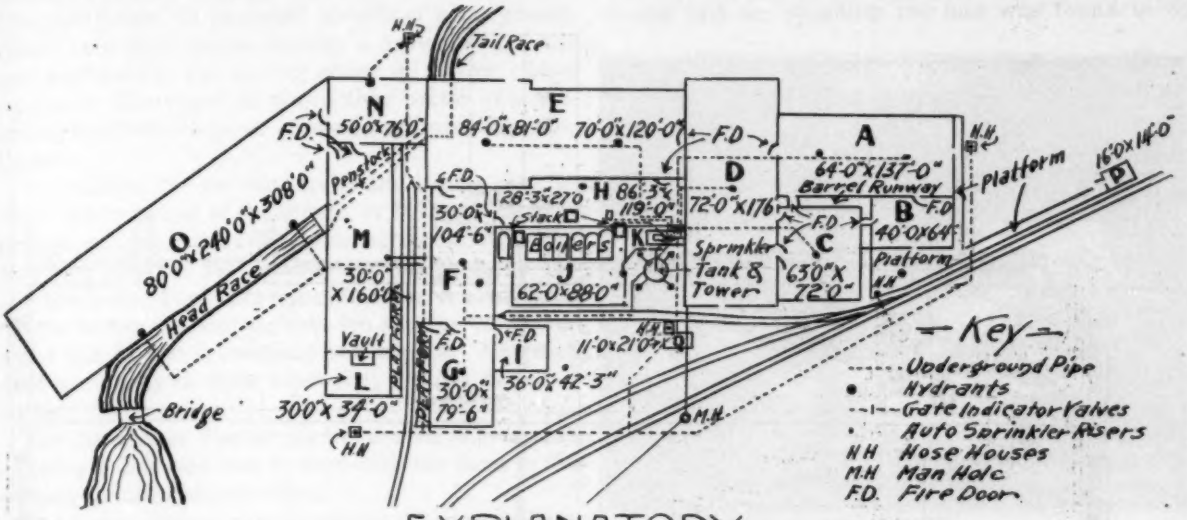
Utilization of Discards from Sorting

The discards, which amount to thirty or forty tons a month, are of course properly sorted into classes. This is done in the sorting room and requires no additional help. The print is usually separated into what is called "white print" and is sold as such to mills making cheap blanks and liners. This grade brings from 85c to $1.00 per hundred pounds depending on the ruling market price and the quality of the packing. Colored print and heavy colors are usually sold to be made into board and the same is true with book backs. These sell from 50-85c. Occasionally all of these mentioned discards are worked over at the

mill, which with about ten per cent of unbleached sulphite, serves to make a fairly good quality of heavy card wrapping for shipping rolls and soft fold bundles. This product sells for about $90 a ton, but considering the amount of dirt that must necessarily enter into this grade, it is not a paying proposition since a much better grade of sulphite fibre wrappers may be had at almost the same cost.

The colors might be sorted to each color, such as blues, reds, greens, browns, yellows, and cooked separately, washed and bleached partly and then worked over into colors again. Since a majority of the fibers of these papers consists of soda and sulphite a sheet could be made to sell for $50 to $60 a ton. The only drawback to this scheme might be the limited amount of stock to be obtained of each color and the consequent question of disposal of small lots.

Since deductions are made for excess discards on paying the original invoice of the paper stock, it is safe to say that it is more profitable to sell this outright, and no loss is attendant on doing so.



EXPLANATORY

Bldg	Construction		Roof	Used As
A	4 Story & Basement	Brick	Carey	Paper & Rag Storage & Sorting
B	4 " " "	"	"	" " " " Cutting & Dusting
C	2 " " "	"	"	Bleaching Bldg.
D	1 " " "	"	"	Beater Room
E	1 " " "	"	"	Machine "
F	1 " " "	"	"	Finishing "
G	1 " " "	"	"	Packing & Shipping
H	1 " " "	"	"	Engine Room
I	1 " " "	"	"	Repair Shop
J	1 Story & Basement	Brick	Carey	Boiler & Coal Room
K	1 " "	"	"	Fire Pump & Valve House
L	1 " "	"	"	Office
M	1 " " Part Basement	"	"	Finishing Bldg
N	1 " " Basement	"	"	Color & Storage Rooms
O	1 " "	"	"	Coating Bldg.
P	1 " "	"	"	Lime House
Q	1 " "	"	Slate	Oil House
R	1 "	Frame	"	Barn & Storage

Print No. 1. Plan of Entire Mill

Conveying Papers to the Dusters

The waste papers after being carefully sorted by the sorters, are placed into barrels or other suitable containers beside their benches. These containers will hold 100-150 pounds and when full are trucked away by men to the conveyor. This work of trucking appears quite laborious, inefficient and antiquated. It has some good features, however. All these containers are numbered with the sorter's bench number, and when the papers are thrown upon the conveyor to the duster, by the two men who attend to this work, the papers are again carefully looked over for discards that may be present, due to oversight or carelessness on the part of the sorter. If the amount picked out by these men runs high, the container is returned with the rest of the papers that still remain in it, with instruction to the sorter to sort it over again.

With the system in vogue in some mills of sorting the papers directly onto the conveyor, one can easily see, from the paper made from this sorting, that an excessive amount of print is present. The sorter is the cause of this, for, working on the basis of hundred pounds, she becomes careless, knowing that she cannot be detected, in her endeavor to make as much money as she can.

Considering the expense in the wages of two men for trucking the papers at $3.65 each for nine hours, which is equivalent to $2263.00 for 310 working days, it is a debatable question as to whether it would be advisable to install this direct-sorting conveyor. In doing so it would reduce the expense, but at the same time do a great injury in offering a possible sacrifice in quality of the finished paper, due to the heedlessness of the sorter. The economy gained by eliminating truckers is, in my mind, false economy, ordi-

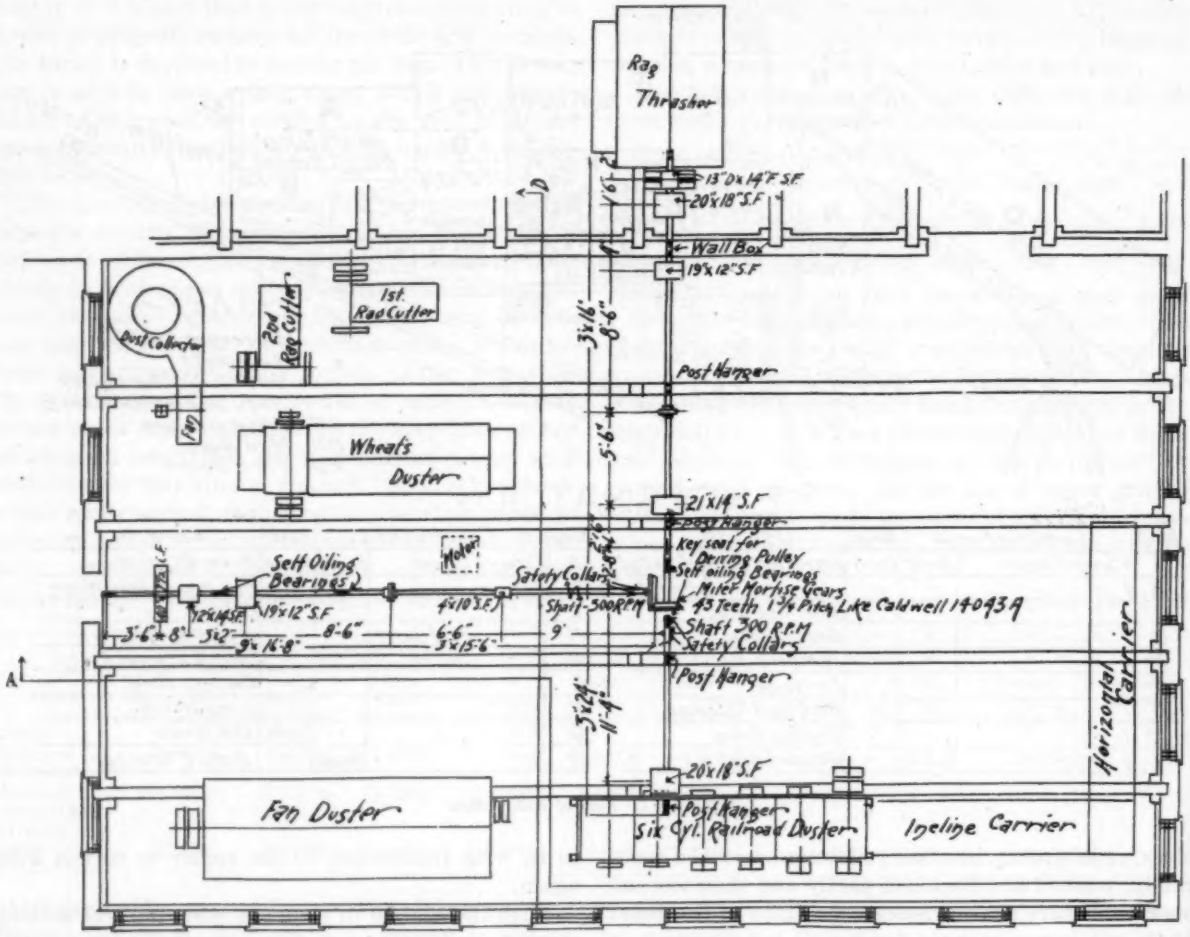
narily; it might be advisable if the waste paper to be sorted was of good quality and did not contain too high a percentage of discards.

Machinery in Dusting Room

The machinery in the usual sorting room consists of the conveyors, railroad duster, fan duster, and the dust collecting apparatus. For a capacity of twenty tons in ten hours all the necessary power is supplied by a 35 H. P. D. C. motor; drives for each of the above mentioned separate units are taken from a line shaft.

The old method of handling papers consisted in emptying the containers full of papers onto a conveyor running at a moderate speed. Here the papers received at least searching scrutiny for discards and were then carried on to a second conveyor belt moving at about twice the speed of the first. This carried the papers to the railroad duster in which the papers are thrashed and shredded and thoroughly separated into individual sheets. This shredding is accomplished by the papers feeding between two rolls on which are arranged staggered pin-teeth. Figure (3) will show the general details of this railroad duster. This duster is four feet in width and has six cylinders and has a capacity of 5000 lbs. of waste paper per hour.

The end of the railroad duster empties into the fan duster. The general action of the fan duster is similar to that of other rotary dusters in use. The papers which are introduced into the feed aperture of the slowly rotating screen are therein rapidly struck, tumbled and loosened up repeatedly by the fast revolving beater, so as to separate from the papers dust and dirt that may then fall down thru the meshes of the screen, onto the bottom of the casing, as the papers are progressively beaten and tumbled along thru the screen and are discharged in loose condition.



Print No. 2. Plan of the Old Paper Sorting Room

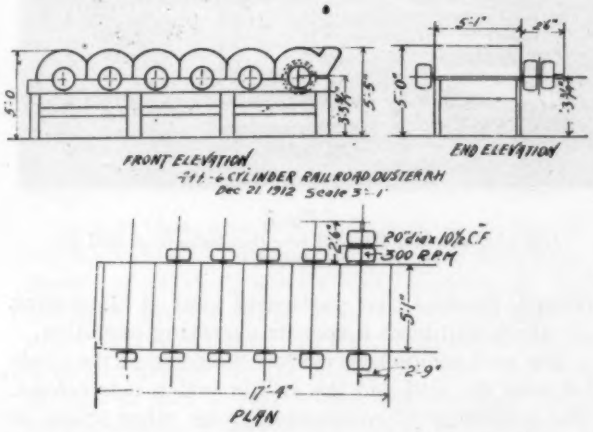
To render the fan duster capable of progressively and thoroly tearing apart, beating and dusting and freely discharging in loose condition papers as fast as they are properly fed into the rotary screen, the screen is made with a series of lengthwise internally ribbed projecting bars, in a tapering form, much larger at the discharging end. The rotary beater is also made with its body, and the series of pin-teeth of a similar or nearly corresponding tapering form in general outline, and of a smaller diameter

than the screen. The screen and beater are furnished with driving mechanisms whereby slow rotary motion is imparted to the hollow tapering screen and a greatly faster rotary motion is given to the tapering beater, either in the same or opposite direction. By thus having the slowly rotating, hollow, internally ribbed screen of a greatly tapering form and the rapidly revolving pin-tooth beater of a similar tapering shape, old papers fed into the small end of the screen can be thoroughly broken up, dusted, and discharged freely in loosened condition at a greatly faster rate than can be done by a duster of like size and movements, but having either its hollow ribbed screen, or its winged or pin-toothed beater of a general cylindrical shape, or of nearly uniform diameter thruout.

In practice the revolutions of the beater may be about thirty to one of the screen, or in a considerably greater or less ratio. When the screen is about ten feet long and five feet in diameter at the large end and the beater is of corresponding size, a good speed for the screen is about eight to ten and for the beater about 250 to 300 revolutions per minute. However good work may be done when they revolve faster or slower.

The fan duster discharges the dusted papers onto a conveyor belt and this in turn delivers them to the cooking tanks or storage bins.

The power necessary to drive the conveyor belts is



estimated as between 1 and 2 H. P.; for the railroad duster, 10 H. P.; for the fan duster, 5 H. P.; for the exhaust dust fan about 10 H. P. These figures will of course vary according to the load exerted on the apparatus.

The exhaust fan is connected to both dusters and carries off a continuous stream of air laden with dust and dirt of all kinds. This is carried to a patent dust collector which mechanically separates the dirt and purifies the air before it is sent outside. The amount of dust removed will of course vary with the kind of stock being handled, but in any event it is considered an inconsequential item. It amounts to about 100-150 pounds per day or approximately 0.25-0.375% shrinkage of a sorting capacity of 40,000 pounds.

A sample of this dust was collected and analyzed. It was first weighed as collected and dried at 105 C. to constant weight. The loss was 5.90%. It was then digested for two hours in warm dilute hydrochloric acid, filtered and washed. Residue was dried and weighed and showed a loss of 3.55%. The filtrate was further treated and consisted of iron and aluminum sulphates 2.30% and calcium sulphate 1.25%. The residue was next ignited to a white heat, cooled and on weighing the loss was found to be

Photograph Showing Old Paper Sorting Room with Ideal Light and Ventilation

77.41%. The ash was a white color and proved to be clay or insoluble silicate. As one would naturally expect the greatest part of the dust is volatile organic matter and in reality it is pure pulp fibers and would serve as an excellent filler in certain papers. In tabulated form the analysis is as follows:

Moisture at 105 C	5.90
Pulp Fibers	77.41
Clay	13.13
Alum	2.30
Calcium Sulphate	1.25
Total	99.99%

One or two of the more progressive mills vary their method of handling the sorted papers from the usual procedure. In one instance, the mill does away with the railroad duster in their endeavor to reduce expenses and have their paper shredded better. This is accomplished by a shredder, which shreds the papers to irregular pieces about 4 to 8 inches square. This machine has also connected with it an exhaust dust fan. It delivers the papers to a continuous conveyor rake, which drags the papers up a short inclined coarse mesh screen. This succeeds in screening out much of the finer and heavier dirt. From this the papers go to the fan duster and receive the treatment mentioned before.

(To be continued in October issue)

Increased Production Through Correct Lubrication

By A. H. PRITCHARD

This Paper Was Presented at the Meeting of the American Pulp and Paper Mill Superintendents' Association, on July 31, 1919, at Green Bay, Wis.

LUBRICATION of paper mills is a factor in their operation that is seldom given the consideration it should have. When it is brought to the attention of mill owners and superintendents they are inclined to regard it as being of minor importance.

The reason for this is that the item—cost of lubricants—is a small figure when compared to the cost of raw material, labor, maintenance, and coal.

Yet the quality of the lubricants and their method of application have a large influence on all of these large cost items.

Each will be taken up later in this article and we will show what influence correct lubrication has on each item mentioned.

Correct lubrication is necessarily based on two factors, quality and suitability of the lubricant, and the method of its application.

In dealing with lubricants it is important to go back to their origin or crude. Correct selection of the crude is absolutely essential if we desire to manufacture a real lubricating oil.

Crudes are found in many parts of America. The original discovery was made about 1850 in Pennsylvania. It has since spread to Ohio, West Virginia,

Fig. 1
Battery of Oil Stills

Indiana, Illinois, Kentucky, Kansas, Oklahoma, Texas, Mexico, California, Wyoming and Canada. With such a wide distribution of crudes it is evident there is just as wide a variation in their nature. Crudes are found that are light enough to be used in place of gasoline in the automobile engine. With this as one extreme we find the opposite, which is an extremely heavy black colored oil heavier than any steam cylinder oil commonly found on the market.

It requires an extensive experience and knowledge of crudes to correctly select those which will when

Fig. 2.
Line of Condensing Tanks Where Distillates from Still Are Condensed

refined, produce that particular kind of lubricating oil which will meet a specific operating condition.

The next requisite is correct handling of the crude between the well and the still in which it is refined. The possibility of contamination by other crudes is an important factor. The time given to settling of the crudes both in field tanks at ordinary temperatures, and refinery tanks at higher temperatures is necessary.

Proceeding further the method of distillation, whether destructive or fractional, is another important factor. Destructive distillation is carried on with a pressure up to 40 pounds per square inch in the still. The lubricants produced by this method are of lower quality than those manufactured by fractional distillation.

Fractional distillation is carried on with a vacuum on the still as compared to pressure in the destructive distillation method.

Under a vacuum we secure vapors from the crudes

*Copyright by A. H. Pritchard.

at lower temperatures than when pressure is present; entirely similar to the evaporation of water.

We have mentioned a still and a description is in order. It is a large cylindrical tank laying horizontally, like a boiler, and 15 feet in diameter and 18 to 20 feet long.

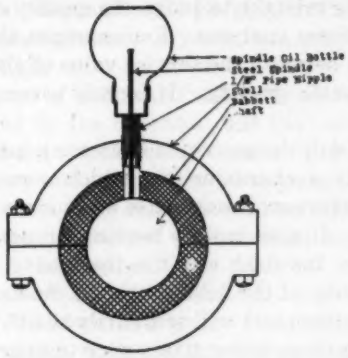


Fig. 3
Sectional View of Bottle Oiling Device

It has a capacity of 450 barrels and is the largest size possible where fractional distillation is employed, distillation being carried on under a vacuum. With destructive distillation it is possible to build stills of larger capacity—about 1500 to 2000 barrels capacity. The larger size is possible due to there being no vacuum on the still, rather an internal pressure up to 40 pounds.

A battery of stills resembles a battery of horizontal boilers. (Fig. 1.) They are set in brick work with provision for fire box beneath. The fire is much lighter than in the case of a steam boiler.

Leading from the still is a pipe of large diameter which carries away the vapors to a condensing tank. (Fig. 2.)

Some of these vapors will condense in the line leading from the still. Here again we find a difference in fractional and destructive distillation methods. With the latter process the lines are so laid out that they drain back to the still. In the fractional method all lines are drained to the condenser box, this being carried to such a degree that the shortest vertical nipple possible is used at the top of the still and the horizontal line is then drained to the condenser box. In destructive distillation we find a number of pipe lengths making a coil or really an "air condenser," all such lines draining back to the still.

In addition to this in fractional distillation the top of the still is well insulated from air cooling to prevent any condensing of vapors rising from the contents of the still.

If condensed vapors drop back into the boiling oil they will again be broken up into lighter fractions, thereby increasing the production of burning oils, and depreciating the value of distillates that follow from which the lubricating oils are made.

Distillation is first started in the still, in fact it starts before the crude reaches the still in what is known as a fore-warmer. This device warms the oil before it enters the still, heat being supplied by the hot vapors coming from another still. It raises the crude to a temperature of about 120° F. and some of the lighter naphthas are returned direct to the running house without having gone thru the still.

In this running house there is a "look box" provided for observing the character, quantity, color, etc., so that the condensed vapors or distillates can be separated. From this point they are called "cuts" and a manifold is connected permitting separation into different storage tanks.

Division is made depending on certain physical tests of the distillates in the run house.

The lighter distillates, which are more volatile, come over first and as the process continues the products get heavier until distillation is completed. The heavier of these distillates is the source of our engine or machine oils. That portion remaining in the still

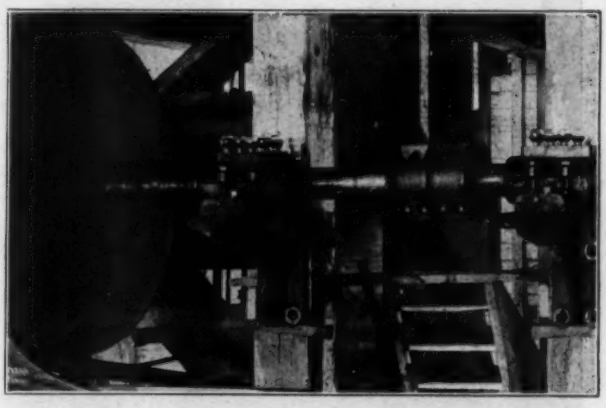


Fig. 4
Oil Bottles on Main Line Shaft Bearing Next to Main Drive Pulley

is a heavy dark oil which we know as cylinder stock. The process is discontinued when this cylinder stock has reached the required physical tests.

We have mentioned physical tests and believe it a good plan to describe these.

Gravity is simply a relative figure comparing the weight of a quantity of oil with the same quantity of water at 60° F. The Baume scale is used by all oil companies. It is not, however, the actual specific gravity, but is a table of comparisons. It is measured by a hydrometer and Baume reading is read direct without the trouble of converting actual specific gravity to Baume.

The Pour Test of an oil is the lowest temperature at which an oil will pour. The Pour Test is secured by applying a refrigerant to a flask holding the oil, and reducing its temperature until the oil is a solid. While the oil is still liquid a thermometer is inserted. The flask is then placed with the surface of the oil in a vertical plane, the temperature is raised until oil

starts to flow. The thermometer then shows the lowest temperature at which the oil will flow.

The Flash point of an oil is the lowest temperature at which the vapors arising therefrom flash or momentarily ignite without setting fire to the oil itself, when a small test flame is quickly approached near its surface in a test cup and quickly removed.

The Fire point of an oil is the lowest temperature at which the oil vapors take fire and burn continuously when a small test flame is quickly approached near its surface and quickly removed.

Viscosity is a term which is frequently heard in connection with lubricating oil. It is much misunderstood and is worthy of a full explanation.

Viscosity is determined by placing 100 cubic centi-

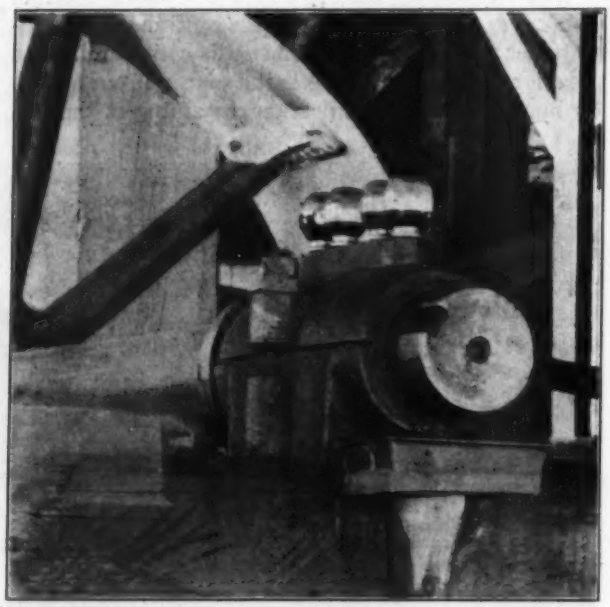


Fig. 5
Main Drive Shaft Application

meters of oil in a flask and heating to the temperature at which it is desired to obtain the viscosity. These temperatures are usually 70° F., 100° F., 140° F. and 210° F. When viscosity is mentioned, the temperature at which it is obtained should always be given.

When the oil is heated to the required temperature a cork is drawn opening a standardized hole in the bottom of the flask at the same time that the cork is drawn, a stop watch in the hand of the operator is started. When 60 C. C. of oil has passed thru the hole the stop watch is checked and the viscosity is the number of seconds required for 60 C. C. of the oil at a given temperature to pass thru this hole.

Engine and machine oils are usually mentioned at 100° F. and cylinder oils at 210° F. One large company uses 104° F. for engine and machine oils and 210° F. for cylinder oils, the reason being that this company has a very large foreign business where Centigrade temperatures are used and 104° F. and 212° F. are 40° and 100° C. respectively.

These physical tests are real checks for the refiner as a guide toward uniformity of product.

It is a big mistake to judge the quality of lubricating oil by these analyses. For example, there can be no relation between the service value of the lubricant and its specific gravity. It is only a comparison of weight.

Neither will the pour test indicate a quality lubricant. It is a characteristic which comes into use when climatic conditions cause low surrounding temperatures. It also has no bearing on service value.

Likewise, the flash and fire tests have no bearing on the quality of the lubricant. In the case of bearing oils the flash test will ordinarily be 325° F. or better. As bearings never attain such temperatures this figure is without value. Likewise, the cylinder oils will run 550° F. or better. As such temperatures are secured under atmospheric conditions it is readily understood that in the absence of air and with a high pressure present, as in a steam cylinder, the flashing of cylinder oil is unknown.

Viscosity being the measure of the thickness or thinness of the oil can therefore have no bearing on its quality. It may have a bearing on its suitability. I mean by that, the lubricating engineer is sometimes guided toward the selection of an oil for a particular purpose by the viscosity term, but woe be to the engineer who selects his lubricant from the basis of viscosity only.

A recent illustration of the lack of value of analysis of oils was found in the aviation fields. The government purchased Liberty Aero Oil and required that it have certain readings. A large number of oil companies manufactured oil which fulfilled the required specifications. Some of these oils would successfully lubricate the Liberty Motor and other types of Aero engines and others would not. Yet they were all of the same readings, all of which goes to show that while readings are useful to check manufacturing, they are of no value when it comes to judging the quality of the lubricant.

You may then ask what is the correct way to select lubricants? There is one and only one real way and that is a selection based on an analysis of the operating conditions together with a knowledge of the service value of the lubricant.

In the selection of steam cylinder oil I use a chart which has a number of factors, all of which are influencing operating conditions.

In the selection of oil for bearings the same method is used, also based on the operating conditions.

You may disagree with the selection of the factors or classification but you must agree that correct selection can only be made when based on the operating conditions.

Next in importance to the recommendation of the

correct oil is the correct application of the lubricant.

Many devices have been invented and are on the market which aim to feed oil in the right amount. Those which eliminate the human factor or those which do not depend on the judgment of the operator as to the amount necessary are best adapted to feed the correct oil.

In the case of steam cylinder oil this rate of feed is controlled by the operator, but the correct design of lubricator is operated in unison with the speed of the engine and in the case of a variable speed engine, such as is used to drive the machine room, the rate of feed is increased or decreased dependent on the speed of the engine.

A device well adapted to feed oil to bearings in a paper mill is shown in Fig. 3. It contains 4 ounces of oil and under ordinary operating conditions this amount of oil will last three to four weeks. This device is entirely automatic. It feeds just a certain amount of oil and in cases of larger bearings more oilers can be applied. It does not feed when the shaft is idle. It always puts the oil where it will do its work, i. e., between the shaft and the bearing. It eliminates waste and drippage from the bearings. In the case of large bearings where many oilers are used they afford many points for distribution.

In Fig. 4 is shown a 6" shaft in a wood room. The pulley shown is the main drive from the engine. Shaft speed is 290 R. P. M. Bearings are plain, 18" long.

On one bearing shown there are four oilers supplied while on the bearing beside main drive pulley five oilers are required.

Previous to the installation of these devices these bearings were oiled by hand every fifteen minutes with an ordinary grade of machine oil, requiring 60 to 70 ounces of oil per day.

A high grade oil correctly selected was used later in the devices as pictured and 52 ounces of oil was sufficient for 26 days' run.

Figs. 5 and 6 show other installations of these devices in wood rooms.

These devices have real value in themselves but the lubrication engineer must have a full knowledge of the kind of oil suitable to both bearing and the oiler. Also because of the very small amount of oil fed it must necessarily be of high quality and correctly manufactured.

The real result of correct lubrication of machinery is the saving in power. Lubrication is not often associated with friction losses, yet that is our reason for applying a lubricant. If it is true that some ordinary oil will save a ton of coal, it is equally true that the same quantity of high grade oil will save more. As a practical result of suggestions based on many years' experience with high grade lubricants it has been proved possible in many paper mills, by the use of such oils to reduce the total expenditure of power by from 5 to 18%. In a few rare cases it ran higher showing a maximum saving of 34%.

Following is a summary of a test which ran thru a period of twenty-six days.

This machine room was motor driven and accurate hourly readings were made by the plant officials during this lapse of time with one oil in use.

Another oil was installed and after two weeks' service a record for twenty-six days' run was also kept by the plant officials.

In this case no change was made in the method of application, however. Application being the same with both oils.

	B. Oil	A. Oil	Difference
Average K.W. hours demand per lb. of paper	.0512	.0434	.0078
Average production per K.W. hour in lbs.	19.5000	23.0000	3.5000
Average feet per K.W. imput	165.0000	174.0000	9.0000
Average K.W. hour demand per hour	164.9000	148.1000	16.8000
Average production per hour in lbs.	3321.0000	3413.0000	192.0000

Total hours of operation, B. Oil.....485
Total hours of operation, A. Oil.....494

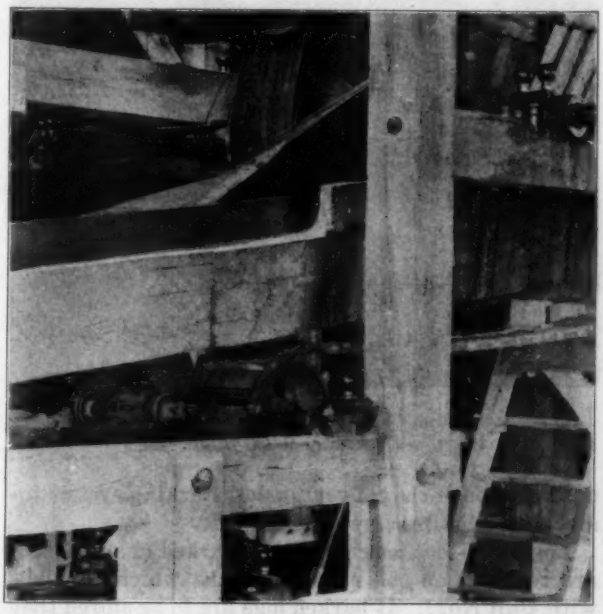


Fig. 6
Woodroom Machinery Application

Net K.W. hour saving for test period.....7,299
Net K.W. hour saving per year.....120,900
Net saving in power demand of.....10.2%

Many other tests have shown a greater percentage

(Continued on page 437)

Mechanical Handling of Storage Pulp Wood

By M. W. HIBBARD
Manager Engineering Construction, The Jeffrey Mfg. Co.

DURING the labor shortage of 1918 the P. H. Gladfelter Company, at Spring Grove, Pa., faced the difficulty of handling a large volume of pulpwood material at a time when every available man was needed for other work in the mill. How completely they succeeded in solving the problem may be judged from the accompanying photographs and

Fig. 1. 1 in. cable with 6 in. diam. clamps. Spaced every 8 ft. and operating at 100 ft. per min.

descriptions of the conveying and stacking system installed for taking care of this work.

Logs in 4-foot lengths, either barked or unbarked, are received on the railroad tracks which parallels with Unit No. 1. If barked logs are to be stored they are unloaded from the cars on Unit No. 1, which passes them to Unit No. 7 and stacks them on the space available for storage. If these logs are unbarked and are destined for storage they go from cars to Unit No. 1, which passes them to the Unit No. 2, which puts them through the barking drum to Unit No. 3, and then returns them back to Unit No. 1, which in turn delivers them to stacker conveyer Unit No. 7. If unbarked logs are to be put immediately thru the mill they are handled by Units Nos. 1, 2 and 3, and then to No. 4, which will put them directly thru the chipper in the pulp mill.

From the storage pile by the operation of Units Nos. 8, 1 and 4, barked logs can be taken directly from storage and delivered to the chippers, the only part of the work which must be done manually being the placing of the logs on the conveyers, the entire distance from that point to the chipper being then covered by the logs without any further attention.

Unit No. 1 (Figure 1) is a cable conveyer, 1-inch cable with 6-inch diameter conveying clamps spaced every 8 feet, transmission clamps intermediate between the chain clamps. The conveyer operates at a speed of 100 feet per minute and has a nominal speed the conveyer if desired.

of 10 cords per hour, which can easily be doubled by

Figure 3 shows the driving machinery at the head of the conveyer, and gives a good idea as to the ruggedness and general character of the equipment.

Figure 4 shows a flexible tooth expansion rim cable

Fig. 2. A No. 110 chain with special spurs spaced every 6 ft. operating at 100 ft. per min. at an angle of 30°

sheave, consisting of a flexible tooth, which so backs up the cable to prevent snapping of the cable as the flights leave the sheave. The expansible run feature allows an adjustment in the pitch to compensate for the wear of sheave and flights and, furthermore, for replacements or sheave renewals. It is possible to

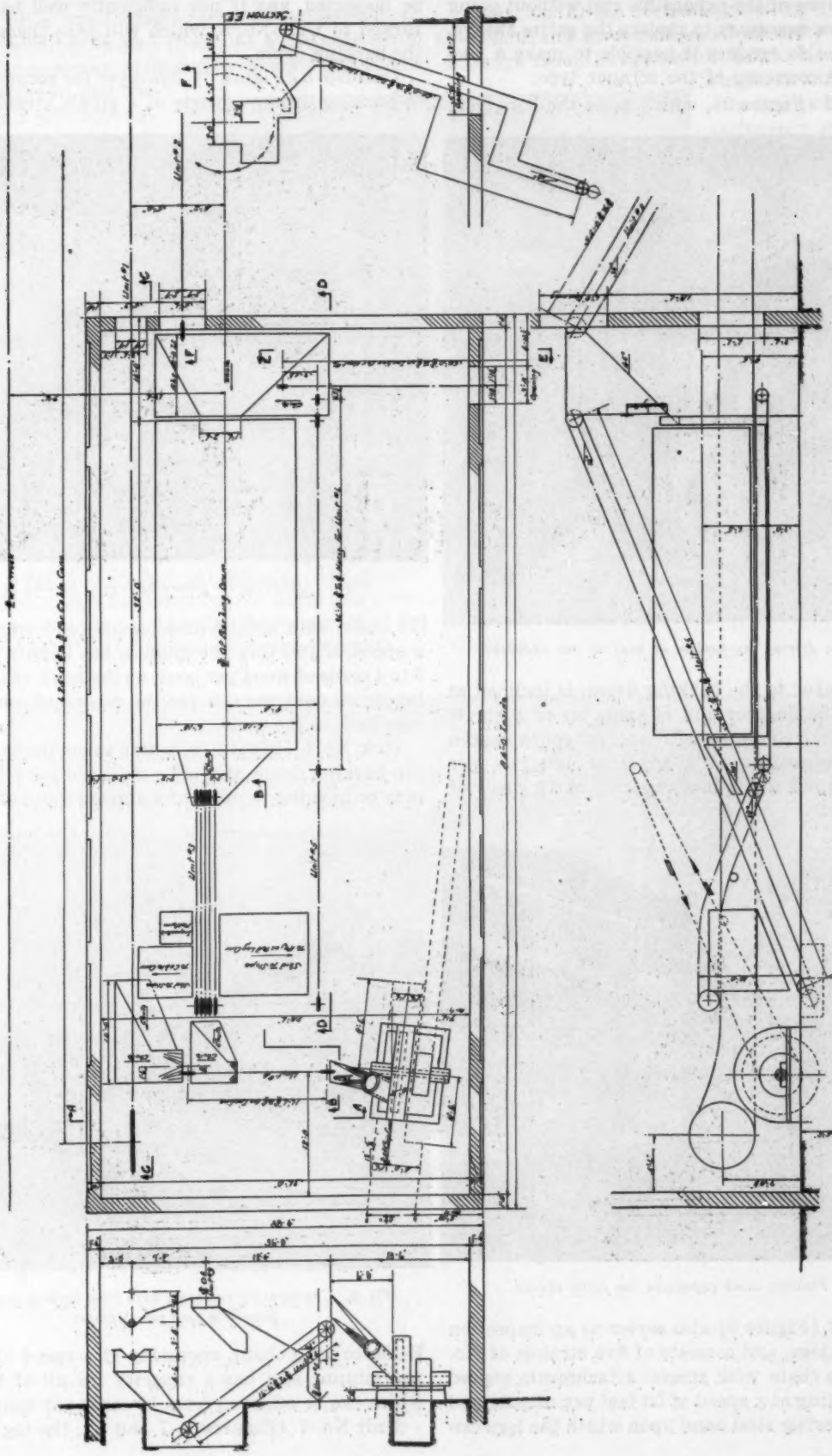


Diagram of the equipment for handling pulp wood at the P. H. Gladfelter Co.'s mill, Spring Grove, Pa.

replace portions of the expansible rim without going to the expense necessary to replace the entire sheave. This sheave also renders it possible to make a successful cable conveyer of the scraper type.

Unit No. 2 (Figure 2), which takes the logs from

Fig. 3. The driving mechanism at head of the conveyor.

the log conveyer to the barking drum, is inclined at an angle of 30 degrees and is made up of a single strand of No. 110 chain with special spurs spaced 6 feet and operating at a speed of 100 feet per minute; also has a nominal capacity of 10 cords of wood per hour.

Fig. 4. Flexible tooth expansion rim cable sheave.

Unit No. 3 (Figure 5) also serves as an inspection table for the logs, and consists of five strands of No. 111 Hercules chain with special attachments spaced 6 feet, operating at a speed of 50 feet per minute and forming a moving steel band upon which the logs can be inspected, and if not sufficiently well barked returned to Unit No. 5, which will pass them back to the barking drum.

Unit No. 5 (Figure 5), conveyer for returning logs to barking drum, consists of a single strand of No.

Fig. 5. Conveyor for returning logs to barking drum.

110 chain with special attachments and operates at a speed of 100 feet per minute, but is only rated at 3 to 4 cords of wood per hour, as the work of the barking drum does not call for the return of very many logs back to the same.

Unit No. 6 (Figure 1), which takes the bark from the barking drum and piles it in the yard for shipping or burning, is made of a single strand of No. 102

Fig. 6. Conveyor for removing bark from barking drum and piles it in yard for shipment.

Reliance drag chain, operating at a speed of 50 feet per minute, and has a capacity for all of the bark which can be removed from 10 cords per hour.

Unit No. 7 (Figures 6, 7 and 8), the log stacker,

consists of a steel frame properly supported on wheels traveling on two tracks at a distance of 20 feet center to center, arranged to take wood from the cable conveyor and elevate it to a pile approximately 50 feet high. It consists of a single strand of No. 110 chain with spur attachments every 6 feet, and operating at a speed of 125 feet per minute, and has a nominal capacity of 10 cords per hour of logs 16 inches in diameter and 5 feet long, although this capacity has been exceeded in actual practice. The conveyor is propelled along its track by the same motor that operates the chain, driven thru bevel gears and chain drive, and has a speed of 50 feet per minute. The stacker is provided with a platform for the operating force, walkways along the runways for the inspection of the chain, and balanced by a concrete counterweight.

Fig. 8. The stacker is provided with platform and walkways for inspection and safety.

Unit No. 8, the reclaiming conveyer, consists of flexible frame construction, which resolves itself into a trough mounted upon skids, in which trough runs a single strand of No. 103 detachable chain, with attachments spaced 6 feet apart and capable of handling 10 cords per hour at a nominal speed of 100 feet per minute. This frame is made in sections, which can be easily coupled together and yet which are of sufficient flexibility to allow for the ordinary misalignment in such a structure.

The entire equipment has given every satisfaction in operation, and has resulted in the saving of a large amount of labor which could be put to other duties in the mill.

It was designed and manufactured by the Jeffrey Mfg. Company, but erected by the P. H. Gladfelter Company.

Fig. 7. The log stacker and the reclaiming conveyor.

Analysis of Water for Steam and Power Purposes

By R. E. DAVIS, B. Sc.

THE chemical examination of water for industrial purposes is quite a different thing from its examination to determine its sanitary character or its potability. In the latter case the mineral content, if within reasonable limits, is of no consequence, while the presence of certain forms of organic matter which may indicate contamination by sewage is of prime importance. In the case of water for industrial purposes, its value is quite largely dependent on the kind and amount of mineral matter present, and as a rule little attention is paid to the organic matter which the water may contain, except the water used in the actual paper making operations, where it may be the cause of mold spores in the finished paper.

Mineral Substances in Solution

Water in passing through the soil comes in contact with many substances which it takes into solution. When the water has taken up certain products of decomposition of organic material, especially carbon dioxide and humic acids, its ability to dissolve mineral matter is greatly increased. Thus it is, that limestone, feldspar, and other rocks are constantly being decomposed, and the water takes up the soluble products of decomposition. In this manner, the water gains varying quantities of silica, and salts of iron, aluminum, calcium, magnesium, sodium and potassium.

Limestone is composed of calcium carbonate and magnesium carbonate, both of which are practically insoluble in pure water. In water containing carbon dioxide, both are quite soluble, forming calcium and magnesium bicarbonates. These compounds are both decomposed by heat, and as the heat also drives out the carbon dioxide, this mineral matter can be precipitated by boiling the water.

Feldspar and other igneous rocks are also slowly decomposed by carbonated water, and in this way small amounts of lime and magnesium, and larger amounts of iron, aluminum, sodium, and potassium compounds are added to the water, as well as silicic acid. When the water comes from the coal mines, or has been in contact with culm banks, it may contain some free sulphuric acid and large amounts of iron from the oxidation of iron pyrites. In some parts of the country gypsum and salt may add much to the mineral content of the water.

If water is used for the generation of steam the mineral content may cause much trouble. These troubles may be classed under three heads; first, mineral salts may cause the formation of scale in the boiler; second, they may cause foaming, and third, they may have a corrosive action on the metal of the boiler.

Boiler Scale

Scaling ingredients include silica and compounds of calcium, magnesium, iron, and aluminum. Boiler scale is a disadvantage, because it retards the transmission of heat. It results in the overheating of boiler plates and tubes, thus rendering them more susceptible to the action of sulphur and oxygen, causing rapid deterioration of the metal. Cracking of the scale may also allow water to reach the overheated metal, resulting in the decomposition of the water into hydrogen and oxygen, and the subsequent oxidation of the metal. The most important effect is the loss in heat transmission due to the poor conductivity of the scale. Authorities differ as to the extent of this loss. Parr says that a conservative estimate would place the loss of fuel at ten per cent for each sixteenth of an inch in thickness of the scale. Many of the estimates go far beyond this. In these days of high fuel prices this is an important item to consider. Besides the increased fuel consumption, the expense and time spent in removing the scale must be taken into account.

Foam

The mineral ingredients which cause foaming are usually the salts of the alkalies. Other contributing causes are the presence of quantities of organic matter, and finely divided solids in suspension. The type of the boiler also has a considerable effect. The relation of the mineral content to foaming is not as evident as in the case of scaling. A rather high concentration of alkali salts is necessary to cause foaming in a stationary boiler where there are no other contributing causes.

Corrosion

The exact cause of the corrosive action of boiler water is still a matter of dispute. Water containing magnesium chloride, aluminum sulphate, or iron sulphate may produce free acids by hydrolysis, which have a very vigorous corrosive action. It is possible also that certain conditions may exist, which will produce galvanic action between different metals used in construction, or if flaws or cinder scales occur in the metal the same effect will be produced.

In general water containing chlorides or nitrates of calcium or magnesium, iron sulphate, or free sulphuric acid should be avoided whenever possible.

Analysis

A scheme of rapid analysis of boiler water is given in Stillman's Engineering Chemistry. It is as follows:

Total Solids—The desired amount of water is evaporated to dryness in a platinum dish and weighed. The residue represents the total solids.

Mineral Matter—The residue from the above is ignited, cooled, moistened with distilled water and placed in an atmosphere of carbon dioxide for half an hour. This residue is the total mineral matter combined with carbon dioxide as it existed before ignition.

Organic Matter—The difference in weight between the total solids and the mineral matter represents the organic matter lost in ignition.

Scale Forming Ingredients—Extract the soluble matter from the total mineral matter with small quantities of distilled water, using in all not more than 50 c. c. Filter through an ashless filter and dry the residue remaining in the dish. Dry and ignite the filter and return any matter which it may contain to the dish and weigh. The weight of this residue represents the weight of the scale forming ingredients.

Non Scale Forming Ingredients—The filtrate from the above contains the alkalies and magnesium combined with chlorine and sulphuric acid. The amount can be determined by evaporation and weighing the residue, or by subtracting the weight of the scale forming ingredients from the total mineral content.

To determine the nature of the scale forming ingredients the following procedure is recommended:

Treat the residue of scale forming ingredients with hot hydrochloric acid and filter, washing the residue well with hot water. Dry and burn the filter. The residue represents the insoluble mineral matter, principally silica.

To the filtrate add ammonium hydroxide to slight excess, boil and filter. Dry and ignite the filter. The residue is alumina and iron oxide.

To the filtrate add ammonium oxalate to slight excess and set aside for half an hour. Filter and wash the precipitate with water containing one-eighth its volume of ammonium hydroxide. Dry and ignite the filter. The residue is calcium oxide.

To the filtrate add a solution of sodium phosphate with constant stirring. Set aside for half an hour and filter. Wash the precipitate with water containing ammonium hydroxide. Dry and ignite the filter. The residue is magnesium pyrophosphate, 36.24 per cent of which is magnesium oxide. The results should be calculated to magnesium oxide.

Acidify the filtrate with hydrocloric acid, and boil. While hot add a solution of barium chloride, set aside for half an hour and filter. Wash the precipitate with hot water. Dry and ignite the filter. The residue is barium sulphate, 34.29 per cent of which is sulphur trioxide. Calculate as sulphur trioxide. This represents the sulphur trioxide combined with the calcium oxide determined above to form gypsum.

Where as complete an examination as the foregoing is not desired, a determination of the total solids and the hardness may be sufficient.

The total solids may be determined by evaporating a liter of water and weighing the residue.

The total hardness may be determined by the use of a standard soap solution. Measure 58.3 c. c. of the water to be tested into a beaker, add a few drops of methyl orange and titrate with tenth normal sulphuric acid until neutral. Transfer the neutralized water to a glass stoppered 250 c. c. bottle, and add from a burette the standard soap solution, a few drops at a time, shaking the bottle vigorously after each addition. When a lather forms which remains five minutes when the bottle lies on its side after shaking the end point is reached. Each cubic centimeter of soap solution used is equivalent to one degree of hardness in terms of calcium carbonate in grains per gallon.

Preparation of the Soap Solution—Thirteen grams of sodium oleate are dissolved in a mixture of 500 c. c. of alcohol and 500 c. c. of water and filtered if necessary.

Standardization of the Soap Solution—One gram of pure calcium carbonate is dissolved in dilute hydrochloric acid, and evaporated to dryness. The residue is dissolved in water and made up to one liter. Each cubic centimeter corresponds to .001 gram of calcium carbonate. Take 12 c. c. of this solution, dilute it to about 50 c. c. and add soap solution to it till a lather forms which persists for five minutes. If less than 13 c. c. is required the soap solution is too strong, and must be diluted till 13 c. c. of the soap is just equal to 12 c. c. of the hard water.

The hardness of the water is due to the presence of mineral salts, which form insoluble curds with the soap. These compounds are the ones which cause scale in the boiler, so that a determination of the total hardness gives an estimate of the scale forming ingredients in the water.

Difficulties Encountered in Printing Papers

Part III—The Shrink and Stretch of Paper in Color Printing

By PETER J. MASSEY

(*Continued from August number*)

THE substances used are now as innumerable as are the purposes for which paper is now used. To prevent us from going too far afield, we must limit the number enumerated in this article to those that bear directly upon the class of papers under discussion, namely, printing papers for color printing.

Previous to the advent of the halftone process, the papers used for printing closely approximated the filter papers, with the possible exceptions of the size that was added to prevent or retard ink penetration.

Loaded Papers

No mineral matter was added for any other purpose than to increase the opacity in such stock as Bible paper, and the manipulation of the clay when incorporating it with the paper making fibers, was for a long time kept as a trade secret. The illustrations used before the advent of the halftone were wood and steel intaglio engravings. The depth of cut in these engravings permitted a good print to be reproduced with machine finished or antique finished papers, and some very fine specimens of the engravers' art were capable of giving perfect reproductions with handmade papers.

With the development of the halftone process, it was a very difficult and well-nigh impossible task to produce a perfect print upon anything having a rough, coarse surface. The enormous pressure necessary to print every individual dot upon an uneven surface caused some of the fibers to squeeze in between the dots and remove the ink from the sides as well as from the surface of the dot; the consequence was a blurred or dirty print.

Coated Papers

The paper manufacturers, to meet the requirements of this process, developed papers with smooth surfaces, by either the addition of some mineral matter to the fibers in the beater, or by brushing it into the surface of the finished paper in an additional operation and then supercalendering. In these papers the surface was no longer paper, but a highly polished mineral surface with so fine a texture that it was capable of giving a perfect reproduction of a 250-line screen illustration.

While the coated paper has acquired the advantage of being able to give perfect impressions with halftone plates, the fibers composing the body paper, which are the foundation and structure of the sheet, still retain their identity and original physical properties. The fact that they are not visible on the surface of the paper does not change their properties; they are still present in their entirety. Therefore, the fibers that compose the sheet structure are just as hygroscopic as they were before the paper was coated. If the important fact that the paper retains the same physical properties that are inherent to the fibers from which the sheet is formed is taken into consideration, it will not be at all surprising that the shrink and stretch in color printing is just as bad in the case of the coated papers as it is with the uncoated.

The Volume Composition

The C. B. S. units or volume composition bring out a few interesting points that have a direct bearing on the subject of stretch. Volume composition analysis of an average sheet of loaded print paper gives 38 per cent of the total volume as air space and 50 per cent for the fibers. Since 38 per cent of the volume of the paper is air space, it is logical to conclude that this space will be displaced by the surrounding atmosphere at the prevailing relative humidity, and that each individual fiber will absorb enough moisture to bring it into equilibrium with the relative humidity of the atmosphere.

The increase in moisture content, in other words, the stretch, of any paper will be in direct ratio to the increase in moisture or humidity in the air, and the shrink will be in direct ratio to its decrease. To manufacture paper that will not shrink or stretch is therefore an impossibility, as the fundamental physical property of the fibers from which paper is made is the power to absorb moisture from the atmosphere.

Responsibilities

Taking into consideration all the obstacles that the paper maker has had to overcome in order to reach the present state of efficiency, it is regrettable that the responsibility should be placed directly up to him to perform an impossibility. What the color

printer and lithographer can expect from the paper maker is that he will reduce this variable to a minimum.

By calling the attention of the paper maker to any procedure which the printer may have found to considerably lessen this class of trouble, or to any lot of paper which gives satisfaction, even under adverse conditions, the printer will greatly assist the paper maker in knowing what characteristics of the paper the printer is willing to sacrifice in order to obtain a sheet that will be less susceptible to moisture.

The fact that I have been trying to visualize for you is that the paper maker is expected to take a number of substances, such as rags and wood, which are subject to all the variations that their names imply, and have as their chief physical property power of expanding in the presence of moisture and contracting in its absence, and manufacture a sheet that will not shrink or stretch, which is in direct opposition to this property. He is also expected to duplicate any given order exactly, without any variation—a demand that is neither asked nor expected of manufacturers in any other line of industry except in an approximate sense, as it has been long recognized as a physical impossibility. Why, then, expect it of the paper maker, when it is considered impossible for other industries where the raw materials are much more stable.

Trouble Can Be Minimized

To manufacture paper that will not be hygroscopic with cellulose as the raw material and still retain the qualities necessary for printing is not to be expected at the present time, nor can it be expected unless some substitute for cellulose is discovered, which is possible, but very highly improbable. While we are waiting for this to come about, recrimination will not materially assist us in alleviating this trouble NOW. But by attacking this problem intelligently with all the means at our disposal and giving publicity to any means whereby the paper mill or the pressroom may reduce this trouble to a negligible quantity, something may be accomplished worth while. If both the printer and paper maker work in co-operation with one another along these lines, the problem may be minimized to such an extent that it will be removed from consideration as an important factor.

The Controlling Factors

Since the problem of "shrink and stretch" of paper in color printing consists of three factors, namely: (1) The hydroscopic nature of the fibers composing the sheet of paper; (2) The conditions under which it is handled and stored; and (3) The variable relative humidity in the pressroom, a study of any remedial measures must be based on one or all of these factors, and must review the various measures that have already been put into more or less general practice; a resume of the conditions that tend to intensify the difficulty and give some suggestions that may lead to further improvement. It will then be of value to both the paper maker and the color printer in showing what the other fellow has done to overcome these three factors, and prove that the paper makers are not a "lazy lot," nor are the color printers "established in basements and cellars."

Responsibilities Defined

The first factor is entirely within the paper makers' sphere of influence, and includes not only the raw material itself, but all of the various processes it undergoes that may have any effect on the physical properties of the fiber used and may influence to any extent the moisture of the finished stock up to the time it is shipped from the mill.

In the second factor the responsibility rests upon the mill agent, the jobber, the printer and the large user of printing who buys his own paper; any one or all of the above may be responsible for having stored the paper under improper conditions.

The third factor rests entirely with the printer, and includes the storing, handling, atmospheric conditions, in the pressroom and the time interval between the printing of the various impressions.

Variation in Speed of Different Furnishes

While the problem of "shrink and stretch" in paper for color printing is due to the fact that all cellulose fibers are hygroscopic, there are some variations in the speed at which various fibers will absorb moisture. The period of time required to reach the point of saturation under the same conditions of temperature and relative humidity varies considerably with paper from different furnishes. Paper having a large percentage of ground wood, such as newsprint; paper from chemical pulp, such as music roll paper, and paper that has been given a short, sharp beating, which reduced the length without hydrating the fiber to any large extent, such as used in a few of the offset papers, require a much longer period to become affected than paper made from a well-beaten stock, and then only in a lesser degree.

The Bone Dry Theory

Paper that has been "seasoned" is known to give less trouble in the matter of register than paper that has not been "seasoned." The reason of this is not exactly clear. It is generally accounted for by the commonly accepted theory that the paper is "bone dry" when it leaves the paper machine and, therefore, requires some time for it to absorb enough moisture from the atmosphere to bring it into equilibrium with the prevailing relative humidity.

While this may be true in the case of machine finished papers, or even supercalendered papers that are delivered in rolls, it cannot possibly hold good in the case of coated papers delivered in sheets. The body stock for coated paper is very often man-

ufactured at some point that is a considerable distance from the coating mill, as there are quite a number of coating mills that do not manufacture paper. There is some elapsed time here for the paper to become at least partially adjusted to atmospheric conditions.

The paper, some time after its arrival at the coating mill, is coated and dried at about 90° F., rewound into rolls and supercalendered. It is then cut up into sheets and delivered to the sorting room, where every sheet is examined carefully, all the defective sheets being thrown out.

From the time it leaves the rewind to the time it is packed for shipment it is in contact with atmospheric conditions that closely approximate the conditions that prevail in the average pressroom; in fact, the relative humidity in the majority of coating mills is the ideal average atmospheric condition and is maintained by an air conditioning system.

The "bone dry" theory, while it may be a good hypothesis in the case of other papers, surely can not be advanced as an explanation for the "shrink and stretch" of coated paper. Still the fact remains that "green" coated papers give as much, if not more, trouble to the color printer as do "green" uncoated papers under the same pressroom conditions.

The Deterioration Hypothesis

It is the writer's hypothesis, based on years of experience with printing papers, that the activity of the cellulose, in so far as its hygroscopic properties are concerned, deteriorates with time. This deterioration continues until the fibers become passive to ordinary atmospheric changes and are only affected by the extremes of relative humidity. This hypothesis is given for what it is worth; no extensive investigation was conducted, nor any figures obtained for its support, and is the result of experience and observation, two forms of circumstantial evidence that are not very often sustained by scientific facts and figures; still it is worth just as much perhaps as the "bone dry" theory.

Subjects for Research

Many tests have been performed at the U. S. Forests Products Laboratory at Madison, Wis., on various weights of 13 different papers made on ground wood-sulphite, all-sulphite and kraft furnishes. The tests were conducted in a constant humidity room after proper seasoning of the paper, for which 2½ hours are usually sufficient. Tests were made at 41, 53, 64, 65, 77 and 82 per cent humidity, at approximately 70° F. The Laboratory's standard test condition is 65 per cent humidity at 70° F.

The results of the tests are as follows:

1. The bursting strength increases with decrease in humidity. Total variations in strength of from 21.5 to 30.0 per cent were obtained at varying humidities compared with the standard strength.

2. The breaking length, as tested by the Schopper machine, both across and with the machine direction, decreases with increase in humidity. The papers tested showed a variation in breaking length of from 25.7 to 37 per cent from the standard strength.

3. The stretch of the papers both with and across the machine direction increases with increase in humidity.

4. The folding property of the paper is affected to greater degree by variations in moisture content than any of the other properties. For example, a commercial 60 lb. kraft paper at 44 per cent humidity withstood 968 double folds and at 82 per cent humidity showed a folding test of 6660 double folds. Some papers reached their maximum folding strength below 82 per cent humidity, showing that too high a moisture content may make paper too limber for maximum folding resistance.

The results of these tests are sufficient evidence that the Printers and Lithographers should subsidize further research on this subject. An investigation that would cover the following questions thoroughly and make available to the industry the relationship they bear upon imperfect register would be of great potential value.

The questions of the degree of atmospheric moisture absorption for each class of paper making fibers; the relationship between the absorption of atmospheric moisture and the amount of beating or hydration the fiber has undergone; and the effect that "seasoning" of paper has upon the hygroscopic activity of the cellulose fibers, are subjects that merit some systematic research. The material information to be gained from an investigation of these subjects would yield some very valuable information on many questions of importance not only to manufacturers of printing papers, but to the whole paper industry.

Good Formation

After the paper fiber leaves the beater room, the only factors by which the finished paper could be affected in any way in regard to its shrink and stretch are the shake, speed and drying of the sheet, which do, to a considerable extent, determine the value of the finished paper in this respect.

With papers intended for color printing the paper maker should pay particular attention to the shake on the machine, and endeavor to form a sheet, the cross direction of which will approximate as closely as possible, its machine direction; in other words, a perfectly formed sheet along the same lines as the paper being manufactured for music rolls. A paper that will have the stretch in the machine direction practically the same as in the cross direction will considerably lessen the variation in register.

Uniform Drying

Special attention should also be paid to the drying. The wet web on a paper machine is subjected to con-

traction and shrinkage while passing over the drying cylinders. Any change in the weight of the paper will cause irregular drying and create an unstable condition among the fibers which will be reflected in the irregular stretch of the finished paper. The drying must not be too drastic but should rather be accomplished gradually and in such a manner that the contraction of the wet sheet while passing over the drying cylinders will take place with a gradual cumulative effect, evenly across the machine width as the paper travels toward the last drying cylinder. Great care should always be exercised to prevent hasty or over drying as the paper when finished will be more susceptible to excessive stretch.

These factors, if properly studied, will assist considerably in reducing the difficulties occasioned by excessive stretch. Wherever they have been given considerable study by some of the mills manufacturing papers where stretch is an important factor they have succeeded in reducing complaints in this respect, to a minimum.

Instructions to Machine Tenders

By giving your machine tender definite instructions as to the purpose and destination of his product, you are giving him a great incentive to accomplish good work. If you try this plan on one of your orders, the results will be so satisfactory that you will never return to the old method of giving your employees an order for so many tons of a certain weight paper, without any further instructions to stimulate their efforts for the production of good work. Make every one of your orders contain something that will stimulate the interest of the man who is going to fill it, by calling to his attention the purpose for which it is intended, the various qualifications of a paper that will fulfill this purpose satisfactorily, and give the reasons why these qualifications are a necessity to meet these requirements. *(Continued in October Issue)*

Increased Production Through Correct Lubrication

(Continued from page 427)

of savings than the above. Tests have also been run where the machine room is driven by a steam engine, in which case many indicator cards are taken and an average of these have shown a reduction in I. H. P. to do the same amount of work.

As an illustration of what correct lubrication means we can cite increased production which always follows such when put into effect on calender stacks.

When stacks are hand oiled they speed up when oil is applied, thereby causing a certain amount of "broke." This is especially true on mills making news print and other light papers. Speed increase is due to better bearing lubrication which immediately follows hand application.

Where the correct high quality oil is applied in the proper manner, the speed of the stack will be constant thereby avoiding the large percentage of "broke" and because of greater ease in bearings, require less power for driving the rolls.

Earlier in this article we mentioned the fact that lubrication was linked with the large cost items of raw material, labor, maintenance and coal.

The cost of raw material is reduced in the instance of eliminating a large percentage of "broke" in the correct lubrication of stacks. While all such "broke" is returned and used again there is some loss of raw material, however, there is surely an increase in production which is a big item in itself.

The cost of labor is less when oiling is eliminated and automatic devices used. The entire cost of oiling cannot be eliminated but a part of the time of such labor can be applied to other departments.

With less friction in the bearings there is naturally a smaller amount of maintenance necessary which is an additional item on labor cost. Belt cost, babbitt cost and renewal of machinery are among the cost items that are reduced as well as labor cost.

The power saving, which follows the correct oil, rightly applied, has an effect on the saving of steam, which in turn, has an effect on the amount of coal necessary to make such steam.

In this day of conservation it behooves all of us to conserve our resources from whatever angle and correct lubrication offers us an opportunity to add to the dwindling profits of our employer. He cannot increase his selling price without a large amount of criticism, neither can he reduce his cost of labor by a reduction of wages, without a considerable hazard. He can, however, make the savings mentioned in this article without any difficulty from either source.

Care of Electrical Apparatus in Pulp and Paper Mills

By W. W. CRONKHITE
General Electric Company

THIS is a subject that is often neglected in Pulp and Paper Mills, so perhaps a few hints may be helpful. The following suggestions cover the essential care to which an electric motor is entitled, to assure long life and continuous operation. This care is simply attention that should be regularly and systematically given. A few minutes each week will suffice. I call to mind visiting a Paper Mill where the superintendent was opposed to electric motors, because, as he said, "They require babying." He was showing me his mill and we were in the engine room, where a 500-H. P. steam engine was receiving its usual attention from the engineer and his helper. The helper was busily engaged in wiping up and polishing the engine and the engineer was also busy with his oil can. In other words, this engine was receiving the attention it was entitled to, and as the mill was running on three towers, it meant three engineers on the pay roll. We then moved on to the ground wood mill and there we found two 1500-H. P. motors driving grinders. This mill had installed in all nearly 150 motors of various sizes, representing thousands of dollars' investment and he was paying a man $75.00 a month to look after this investment. Compare the attention the 500-H. P. steam engine was getting to the attention given these 150 motors, totaling approximately ten times the horsepower, and you will get my point, that the engine was not getting too much attention, but that the motors were getting too little.

Selection of Proper Unit

The first recommendation in the care of electrical equipment is to secure the services of a good man who understands his business. When you have done this you have gone a long way toward protecting your investment and toward continuity of service which, after all, is the thing to be desired. Another important and vital point to be considered is the selection of the proper motor as to type and size. No amount of attention will offset improper application. If you want maximum production and minimum power cost it is most necessary that proper motor application be secured.

Alignment and Lubrication

As in any other method of drive, it is important that good alignment be maintained. In the case of belt drive the belt must not be so tight as to cause undue wear or heating on the bearings.

Card Index Record of Each Unit

It is essential that bearings receive proper lubrication. After the motor has run a few days, draw off the oil, pour kerosene or gasolene through the bearings to wash out all sediment; then refill with fresh oil, being sure that no trace of kerosene or gasolene remains in the bearings. When replacing drainage plugs dip them in a mixture of red lead and shellac, so as to prevent leakage. Keep the bearing cap closed tight, oil the bearings always through the oil fillers, and if you would maintain the correct oil level never fill the bearings when motor is running. Most bear- is now building its motors with the bearing cap closed tight. One of the large electrical companies is now building its motors with the bearing cap screwed down tight so it cannot be lifted up by every passer-by. You know the old saying about screening the dirt out of pulp is "not to put it there in the first place." This is true of motor bearings, and the best way to keep dirt out of the bearings is to keep the bearing cap always closed. Often motor bearings get too much oil, which overflows and runs down into the windings; this does not help the insulation any.

Where there is a large number of motors to deal with some mills paint a number on each motor and keep a card record. Every Sunday a certain number of motors are inspected, blown out with compressed air so as to free the windings of dust, pulp, etc., and a record is kept showing just what motors have been looked after. In this way every motor receives regularly a certain amount of attention. When using compressed air for this purpose it is recommended that about 30 pounds pressure be used.

Spraying the Windings with Protective Coating

To protect the windings they should be sprayed with a good air drying varnish. The interval between spraying should be governed by the conditions under which motor is operating. Probably once a year, unless conditions were very bad, and then perhaps every six months.

The varnish should be applied by a compressed air sprayer. The motor windings should be blown out and thoroughly cleaned, preferably with gasolene,

before applying the varnish. The kind of varnish used depends on the conditions under which motor works, whether for general use, moisture, acid or alkalies.

Varnish applied from a compressed air sprayer at a pressure from 25 to 30 lbs. gives excellent results. It is best to get this varnish from the electrical company who built the motor, telling them the conditions under which your motor operates and letting them recommend the proper varnish.

Types of Equipment

We must consider the care of both alternating and direct current motors as both are used in the industry.

There are several types of alternating current motors—squirrel cage, slip ring and synchronous motors. They all have their proper places. Direct current motors are used principally in driving the paper machines and are generally not required anywhere else in the mill.

Squirrel cage motors have no commutator or slip rings and about the only attention this type of motor demands is to give the ends of the windings an occasional spraying and to look after the lubrication of the bearings. This does not mean that motor bearings are not durable for there are any number of installations where motors are running with the original bearings, after ten and fifteen years' service.

Slip ring motors, or motors with collector rings and brushes are used quite extensively in the Paper and Pulp Industry and require a certain amount of attention.

Inspection of the Brushes

See that the brushes move freely in the holders and that they make an even contact with the collector rings.

Brushes should be inspected frequently. We cannot change the laws of nature, so brushes, like everything else, will in time, wear out, so it is well to keep a spare set. When a new brush is put in it should be fitted carefully so that the brush will be shaped to make a firm and even contact with the commutator. There should always be a slight play in the pigtails, for if they are too tight, they will tend to pull the brush out of line and also out of proper contact with the surface of the contactor.

Excessive sparking may be due to overload, brushes not in proper position, or vibration. There are other causes, but the above are, perhaps, the most general. Dirty slip rings will cause erratic operation.

Synchronous motors require very little attention except ordinary cleanliness, proper oiling and attention to brushes.

Starting Up New Equipment

When a new machine, or an old machine, which has been repaired, is first started, see that the oil rings revolve freely and carry sufficient oil to the shaft. Thereafter the rings need practically no attention so long as a proper supply of oil is maintained in the oil wells.

Keep the Oil Well Covers Closed

The same remarks made about brushes on slip ring motors applies to direct current motors. This type is not very generally used in Paper Mills as about the only place they are necessary is in driving the paper machine. A new or newly turned commutator should be cleaned daily until the brushes reach a good fit. If sparking continues the surface should be smothed either by using a piece of sand stone from which a segmental piece has been cut, having the same radius as the commutators or by pressing a piece of very fine sandpaper against the commutator with a block of wood shaped properly. The sand stone or paper should be moved back and forth across the commutator parallel with the shaft, while motor is running full speed. Never use emery cloth. Clean brushes and commutator thoroughly after this operation.

The Commutators

Occasionally, through dirty or sticky brushes combined with possibly a high spot on the commutator, the armature circuit may be entirely opened or a soldered terminal may work loose. The remedy in this case is self evident.

Sometimes in replacing brushes after cleaning, the finger springs used to keep brushes in tension against commutator are not put back into their proper position. This will cause excessive sparking.

When a motor has been running satisfactorily, heats to excess, sparks badly, fails to carry rated load or suddenly stops, or after having been intentionally stopped, refuses to start again, there is generally some simple explanation of the difficulty. If it is convenient, the motor should be disconnected from the driven machine, after which it is a simple matter to determine if the motor is at fault.

Procedure for Locating Trouble

First try to turn over the rotor or revolving element. If it does not turn freely, it may be that because of insufficient lubrication, the bearing linings have become so worn that the rotor rubs against the stator or stationary part. An air gap gage will indicate incorrect clearances. In fact, a visual inspection often suffices to show whether rotor and stator have been in contact. The answer in this case is new bearing linings.

In case of a belted motor, the belt may have been too tight, resulting in undue heating of the linings, causing them to "freeze" or stick together.

If the motor cannot be entirely disconnected from its load, reduce the load as much as possible, see that there are no hot bearings or locked gears on the

(*Continued on page* 442)

The Handling of Size and Alum Solutions

By E. G. MILHAM
Chemical Engineer, Bryant Paper Co.

GENERALLY speaking, there are very few paper mills in which rosin size and alum do not play a more or less important part, and, in the opinion of the writer, the matter of economically handling these materials is worthy of considerable attention.

No doubt, most practical mill men have often seen size and alum "systems" in which there was obviously much room for improvement. The writer recalls once visiting an otherwise fairly up to date two-machine mill in which the method used in handling the alum and size was about as follows: The rosin soap came to the mill in drums containing about five hundred pounds each. These were stored in the basement near the size room. Here the rosin soap was mixed up with water until it was "right" in the opinion of the workman. The resulting liquid, size milk, was then pumped to a small storage tank on the beater room floor, whence it was run into barrels mounted on trucks, wheeled to the beaters and "measured" into the beater by means of a ten-quart pail.

The method used in handling the alum was just about as convenient as that used in taking care of the rosin size. The powdered alum came to the mill in sacks containing two hundred pounds each. These were carried to the basement, and the alum dissolved in water in such a proportion as to give about a 16° Be′ solution. The dissolving process was carried out in barrels mounted on trucks and arranged so that live steam could be blown in to make the alum go into solution faster. After the alum had completely dissolved, the steam pipe was removed, and the barrel of liquor wheeled to the elevator and carried up into the beater room where it was measured to the beaters by means of the ever present ten-quart pail. It is interesting to note in this connection that six men, working in shifts, were required to make up and handle the size and alum used in this one mill. While it must be admitted that the above described "system" is an extreme case, there are, nevertheless, many mills which boast systems which are not of very great improvement over this one.

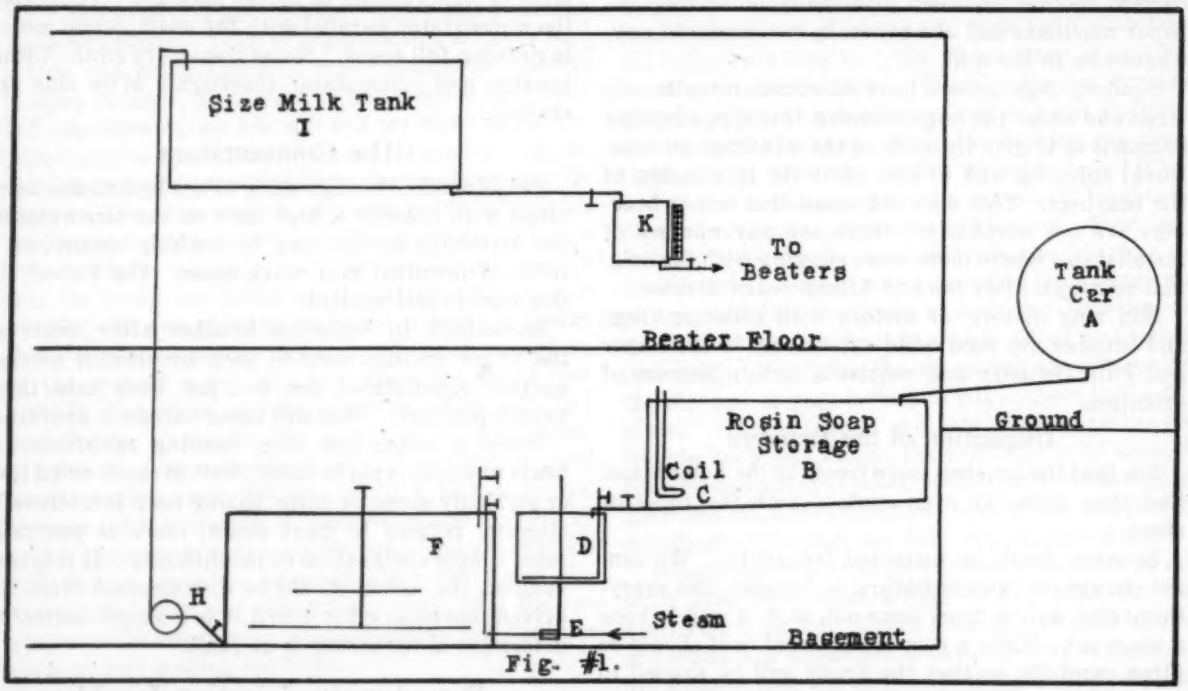


Fig. #1.

The Requisites of a Good Size System

In the opinion of the writer, a first-class rosin size system should possess most of the following features:

1. If very much rosin soap is used, it should, if

possible, be shipped in to the mill in tank cars and many of the troubles arising from the use of barrels and drums thus avoided.

2. The rosin soap should be stored in a place below the level of the platform so that, if the tank car system is used, the soap can be removed from the car by gravity.

3. If proper ventilation can be provided, the operation of diluting, or emulsifying, the rosin soap should be carried out in the basement. This statement does not necessarily apply, of course, to the fairly rare cases where the rosin soap is prepared at the mill from the raw rosin and soda.

4. A storage tank large enough to hold the amount of size milk used in eight hours should be placed in or near the beater room and somewhat above the level of the beaters.

5. A pump of adequate capacity should be provided to transfer the size milk from the emulsifier to the storage tank.

6. For obvious reasons, pipe lines carrying rosin soap or size milk should be as short as possible.

7. The size should be measured to the beater by means of a meter on the storage tank or, better still, by means of small measuring tanks located directly over each set of beaters.

8. Before passing to the beaters, the size milk should be screened through an eighty-mesh wire sieve or, better still, through a cheese cloth sack.

Description of a Good Size System

In the accompanying diagram (Fig. 1) is shown a very satisfactory size system, the method of operating which is as follows: Rosin soap is run from the tank car "A" to the steel or concrete storage tank "B." As required for use, the soap is slightly warmed, if necessary, by steam coil "C," and run into the iron heating tank "D," which is provided with a steam coil and which may conveniently have a capacity of about five hundred pounds of rosin soap. After being thoroughly heated, the soap is emulsified by injecting it into tank "F," containing hot water, and provided with an agitator or a steam jet arrangement for keeping the water in rapid motion.

Notes on the Emulsifying Process

The operation of emulsifying is a rather delicate one and can be successfully carried out only by a careful and intelligent man. The main points to be observed in connection with the emulsifying may be summed up as follows:

1. Be sure that the rosin soap is thoroughly and uniformly heated.

2. Be sure that the water in tank "F" is uniformly heated to about 180° F. and in rapid motion before blowing in the rosin soap.

3. Be sure that the level of water in "F" is lower than the bottom of the cooking tank "D."

4. Be sure that all the size milk from the previous batch is drawn from tank "F" before a new batch is started.

5. Fill tank "F" to the required height with clear cold water, after the soap has all been blown in. Soft water is to be preferred for this purpose if it can be obtained conveniently.

6. It is necessary to keep the liquid in "F" in motoin only during the time that the soap is being blown in.

Handling of the Size Milk

After the rosin soap has once been emulsified, the handling of it is a relatively simple matter. The pump "H" (Fig. 1) forces the milk into the storage tank "I" located somewhat above the level of the beater floor. From here, it is measured to the beaters by means of small measuring tanks, similar to "K," located over each set of beaters. In case the construction of the building makes it impossible to use the small measuring tanks, the size milk may be metered directly at the storage tank "I."

In a modification of the above described system, the emulsifying apparatus is located on the floor over the beaters. While a few things may be said in favor of this modification, it is the writer's belief that most of the advantages lie with the system described, since, in cases where the rosin soap comes in tank cars, it avoids the troublesome problem of pumping the soap, which is disagreeable, and sometimes very difficult.

Notes on Methods of Determining Strength of Size Milk

It is often desired that the strength of size milk be determined; consequently, a few notes will be given on this subject. Many attempts have been made to determine the strength of the size milk by means of the specific gravity method. These attempts, however, have always proved unsuccessful and, as a rule, the total solids method has been the only one generally used. This consists of measuring a given volume (one pint) of the milk out into a suitable dried and weighed dish, and evaporating the milk to complete dryness in a drying oven or even on a hot steam pipe. After the residue has thoroughly dried, the dish plus the dry size is weighed and the weight of dry size per unit volume (gal.) of size milk is calculated.

Requisites of a Good Alum System

The handling of alum liquor is less difficult than handling the size; nevertheless, it is a matter which is worthy of some attention.

The requisites of a good alum system are about as follows:

1. The dry alum should be stored on a floor above the beater room.

2. The alum dissolving tank should be located in

the beater room, above the level of the beaters, and should be so placed that the alum can be dumped thru a hopper from the storage floor above.

3. The agitation of the liquor in the dissolving tank should be accomplished by means of a mechanical agitator rather than by a steam jet.

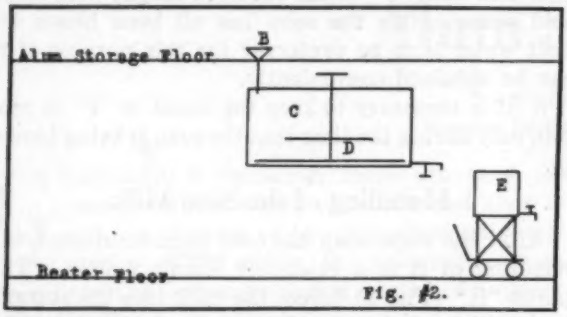


Fig. #2.

4. Iron should not be allowed to come in contact with alum liquor, since this liquid dissolves iron quite rapidly and thus becomes discolored.

5. The dissolving tank should be large enough to hold at least eight hours' supply of liquor.

6. Owing to the difficulty of obtaining a non-corroding material for piping the beaters, and also owing to the relatively small volume ordinarily used, it is usually best to measure the liquor by running it into wooden tubs mounted on wheels so that it can be wheeled to the beaters and run in by gravity.

Description of a Satisfactory Alum System

In figure No. 2 is shown a diagram of a very satisfactory arrangement for handling alum liquor. The dry alum is stored on floor "A" above the beater room and is dumped down thru the hopper "B" into the concrete or wooden dissolving tank "C," provided with an agitator "D." As it is required, the liquor is drawn out into measuring tubs similar to "E," mounted on trucks and provided with a fine brass screen. In these tubs, the liquor is wheeled to the proper beater and run in by gravity.

Conclusion

Of course, the above described systems cannot be regarded as perfect. The chances are that, as described, they could not be worked in all mills to the best advantage. However, the writer's past experience leads him to believe that the adoption of these systems, or slight modifications of them would, in most cases, make toward more convenient and economical handling of size and alum.

Care of Electrical Apparatus in Pulp and Paper Mills

(*Continued from page* 439)

driven machine, then try to start the motor again. If it fails, check over the same items suggested above.

Compensators

Perhaps a word or two relative to compensators and their care would be of some help.

In order to reduce the current when starting squirrel cage motors a starting compensator is employed. When starting the motor the switch should be thrown into the starting position and held there until the motor comes up to speed, and then it should be pulled over into the running position. It does not reduce the starting current to start the motor by "jogging," but it does produce a number of successive rushes and causes the contact fingers to burn badly.

Compensators are shipped connected to the second tap, thus giving the second lowest starting voltage and torque. If motor will not start its load on this tap, the next higher voltage tap should be tried and so on until taps are found which will give the required starting torque. The lowest tap is always next to the core.

Care and Inspection of Compensators

After the compensator is in position and connected, try all moving parts of the low-voltage release mechanism to see that they work freely. Inspect the switch to see that the contacts, etc., are in working condition. See that the oil-box is filled with oil, to within ¼-inch of shaft opening. Occasionally the low-voltage release will start humming. This is due to imperfect sealing surface or to the plunger not sealing. Lowering the holding catch one tooth will usually take care of this.

The levers connected with the low-voltage release should be cleaned and greased occasionally to insure the opening of the switch on voltage failure.

In case of burnout on one coil of a three-phase compensator, the coil may be cut out by a slight change in connections and the compensator used temporarily until a new set of coils can be obtained. Care should be taken to keep all dirt from the oil.

Conclusions

Taken as a whole, electrical apparatus needs very little attention. Just ordinary care such as cleanliness and proper lubrication always assuming you have installed the proper type motor in the first place. In many mills the electrical equipment represents thousands of dollars, and such an investment should be better looked after, and by a man who understands his business. As a general thing, motors in Paper and Pulp mills receives less attention than any other machine in the mill.

If your electrical equipment is given an occasional inspection and ordinary care, they will outlast by years most any other machine used in the mill and with considerably less cost of maintenance.

A Study of Various Types of Belting*

By ERNEST D. WILSON, B. Sc., Ph. D.

Industrial Fellow of the Mellon Institute of Industrial Research of the University of Pittsburgh

EVERYONE who has had experience in the use of belting for power transmission purposes has in a general way decided upon the relative merits of various types of belts and belt materials. He knows that leather can be relied upon to do certain things, and he has a more or less definite understanding of the limitations of other materials. Naturally, since each drive has its own characteristics and difficulties, there is a lack of agreement among the users of belts as to just what the various types of belting will do, and it was to supply this information that the investigation described later was started.

In the course of this investigation power transmission tests were made on two entirely different belt testing machines at different times, and the results obtained check so closely that all data has been combined and incorporated in this report. Tests were made with various types of pulleys, all of which are in everyday use wherever power is transmitted by belting. While different results were obtained with different pulleys, the ratios between the various types of belting materials remained the same. That is, although leather on paper pulleys showed higher results than leather on iron, so also did balata and rubber, and the advantage of leather over other materials remained unchanged.

The Belt-Testing Equipment

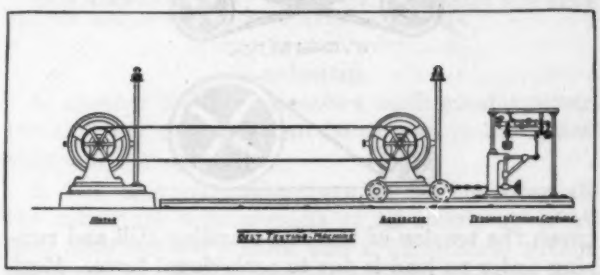
The three essential parts of the belt-testing machine used for conducting these tests are a motor to furnish the power, a generator to furnish the load, and a device to measure the tension of the belt. The arrangement of these three parts of the machine is shown in outline in Fig. 1. All machinery is of the most approved and latest type, permitting measurements of the highest accuracy to be taken.

Both motor and generator are direct-current machines and are capable of developing 100 H. P. They are known as electric dynamometers, and are manufactured by the Sprague Electric Works. The only difference between one of these machines and an ordinary direct-current motor is that the entire field frame is hung on ball-bearings, so that, when running, the "turning force" which the motor is actually applying to the driving shaft is transferred by levers to a beam-scale, where it can be weighed in pounds. By means of this arrangement for actually measuring the driving force applied to the belt, all theory was eliminated, and the data reported represent purely experimental results.

Copyright, 1919, the Leather Belting Exchange.

The power which the belt actually transmitted was measured in the same way by the generator, and the tension under which the belt was running was transferred directly to beam scales and weighed in pounds, as shown in Fig. 1.

The control panel was equipped so that the speed of the motor could be accurately regulated, and the load applied to the belt by the generator varied



throughout a wide range of 0-100 H. P. The speed was measured by two electrically operated revolution counters.

In all tests the pulleys used were 24 inches in diameter, some were crowned and some straight face. In the series of tests on the first set of machines the belt was run at 3770 feet per minute, while in the series run on the second set of machines the belt speed was varied from 2500 to 5000 feet per minute. Most of the tests were made at 500 R. P. M., or a belt speed of 3140 feet per minute.

As is well known, the tension under which a belt is run determines to a large extent the power which it will transmit. Naturally, it is desirable to keep

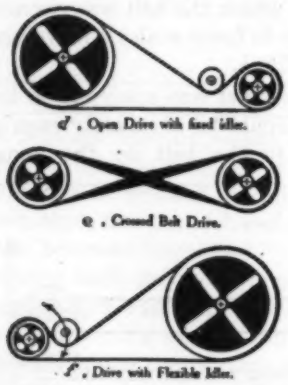
a. Open Drive, Slack on Top.

b. Open Drive Slack on Bottom.

c. Open Drive about 1 to 3 ratio.

the tension as low as possible, both to prevent excessive bearing friction and to avoid unnecessary strains on the belt. In conducting comparative tests on various kinds of belts it is necessary to use the same tension throughout. It was found after a large

number of trials that the best method of accomplishing this was to start from the same tension in all cases, when the belt was running at the desired speed under no load. Tests were made at a number of tensions in order to determine whether or not the relative capacities of the belts changed with changing tension. The light running tension varied from 35 to 75 pounds per inch of width, which corresponds to approximately 45 to 90 pounds per inch of width when the belt is standing still. The difference between the tension of the belt standing still and running under no load is due to centrifugal force. Most of the data here presented are based on tests in which the tension was a little higher than that advised by the manufacturers of the various belts, and ranged from 50 to 70 pounds per inch of width when the belt was standing still.



Results of Belt Tests

The tests were conducted by increasing the load on the belt from zero to a point where the slip amounted to at least 3 per cent and the belt showed signs of distress. Measurements of speed, tension and horsepower were made at each step. The horsepower transmitted by the various belts at different percentages of slip is shown in Fig. 3, where the horsepower is plotted against slip.

The curve for leather belting is a very conservative average of a large number of tests. In fact, it is almost the minimum curve rather than the average. In the case of the substitute belts, however, the curve shown is that obtained in the best test. In the case of the solid woven belting, the curve shown does not take account of the temporary capacity produced by dressing the belt heavily with the sticky dressing sometimes used. Any increased capacity imparted to a belt in this way is not permanent and is a property of the dressing, not of the belt.

These curves show that the fabric belts all possess a very definite maximum beyond which it is impossible to go, and that these points of maximum power-transmitting capacity are below the safe load for leather belting. The leather belts at this speed are rated from 20 to 25 H. P. The curves show that leather belting operating at 25 H. P. has an overload capacity of 60 per cent, while not one of the fabric belts, operating with no factor of safety at all, can carry such a load. While it would not be advisable to operate belts at their full capacities, as shown in Fig. 3, still it is important to know just what margin is available for unforeseen overloads.

A comparison of the various types of belting may be made in another way which takes account of the tension per square inch cross-section of the belt. The relative maximum effective tensions obtained on the basis of 100 for leather are shown in Fig. 4. Since the power which a belt will transmit depends directly on the effective tension it will produce, this comparison is very valuable.

The point which is of particular interest, however, is that of the safe power transmitting capacities of the different types of belting under discussion. It must be remembered that each of the substitute belts is sold with the statement, and often the guarantee, that inch for inch it is the equal if not the superior of leather. A careful examination of the curves in Fig. 3 leads to the conclusion that for this particular drive and four-inch belts the horsepower

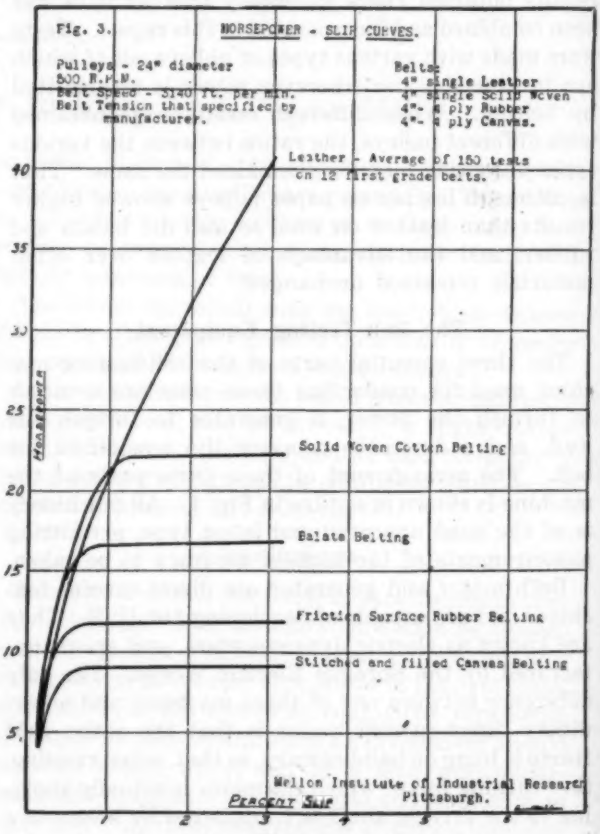


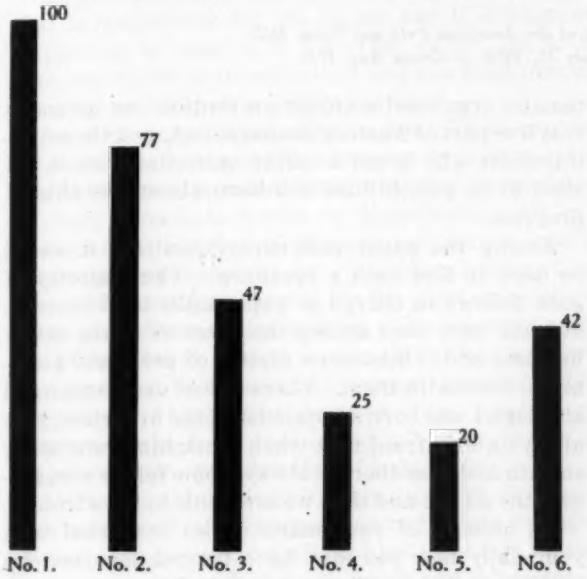
Figure 3

ratings should be as given in Table 1, and from these figures the rest of the table is calculated. The enormous advantage of leather is very apparent, and it must not be forgotten that under these ratings the

leather belt has an overload capacity of 60 per cent, while the substitutes have practically none.

LEATHER VS. SUBSTITUTES

Maximum effective pull of belts per square inch cross-section. Belt speed—3140 feet per minute.



No. 1. Average for first grade, single leather belting.
No. 2. Solid woven cotton belting.
No. 3. Balata belting. Four ply.
No. 4. Friction surface rubber belting. Four ply.
No. 5. Stitched and filled canvas belting. Four ply.
No. 6. Average for the substitute belts.

Mellon Institute of Industrial Research,
Pittsburgh Pa.

Since these tests are entirely comparable with ordinary shop and factory practice they indicate the relative merits of these products. It must be thoroughly understood, however, that for any particular drive it is necessary to use the right belt in order for these comparisons to hold true. The right leather belt for the drive will bear out the above comparisons.

Table 1

	Rated H. P.	Total Lbs. Effective Tension.	Lbs. Effective Tension Per Inch Width.	Feet per Min. to Give 1 H. P. Per Inch Width.	Comparative Value Leather 100.
Leather	25	270	68	490	100
*Solid Woven....	16	175	44	760	65
Balata	12	130	33	1,020	49
Friction Surface Rubber	10	110	28	1,200	41
Stitched Canvas..	8	86	22	1,500	32

Note:—The above figures are safe ratings for the various belts for continuous operation on easy drives; i. e., 180° arc of contact, large pulleys, tight side on the bottom and steady load.
*This refers to the heavy fabric belts, impregnated with gums and oils, and not to the lighter white cotton belts.

Conclusions

1. Leather belting possesses a much greater power transmitting capacity than fabric and in the ratios shown in Figs. 3 and 4.

2. The enormous advantage of leather over all the substitute belts persists at all speeds up to at least 5000 feet per minute, and at all tensions within the range practicable for power transmission.

3. The relative capacities of the various belts remain the same on various kinds of pulleys.

4. Leather belting, at its rated horsepower, possesses a big overload capacity, while the fabric belts at much lower horsepower possess no overload capacity whatever.

5. Leather belting improves with age, while the fabric belts are at their best when new.

6. Wherever a fabric belt of a given width is carrying its load with some degree of success, a suitable leather belt three-quarters as wide will do better work than the fabric.

Are You Oiling the Safety Movement?

By AL KROES
Service Dept. Employers' Mutual Liability Insurance Co.

This Paper Was Presented at the Meeting of the American Pulp and Paper Mill Superintendents' Association, on July 31, 1919, at Green Bay, Wis.

CONGRATULATING this gathering of paper makers on such a fine attendance and superior arrangements, I was indeed very glad to be invited to come here and make a few remarks on the great subject of Safety. It is creditable that this young organization saw fit to include in their discussions a subject so vitally important in the paper industry, or for that matter to any industry. I am always happy to talk on this subject of accident prevention because I am intensely interested in it.

Of course talking about accident prevention to the man in the shop or to you gentlemen is an entirely different matter. A talk to the workman is like pulling down the gates at the railroad crossing and continually ringing the warning bell. It is the everlasting question don't do this and don't do that, and we all know how often this must be repeated to be successful at all. But to talk to you embodies the one great question "are you oiling the Safety Movement?" The safety movement, my friends, has been running along pretty well for the past ten years. To many of you it meant something real when it was but a tender shoot, however, showing great signs of life. To some of you it did not look very promising and little attention was paid to it. But the little plant kept on growing in spite of the chilly winds from some quarters. The Industrial Commission, the National Safety Council, and other valuable agencies furnished plenty of sunlight and moisture and today a shop where the safety movement is not doing well is classed as a back number and, the superintendent who has not seen the light nor has had the right inspiration to get into the harness and help prevent accidents, is a superintendent in name only. Systematic organized accident prevention has become a real live part of Factory Management, and the superintendent who is not a safety enthusiast and is not alive to its possibilities is a barnacle on the ship of progress.

Put the Ax in ACCIDENTS
Yourself
Your Wife
and Babies
ACCIDENTS
will all be Stockholders in the N. A. P. A.
PAYS ANNUAL DIVIDENDS IN FULL WAGES PHYSICAL FITNESS HAPPINESS TO ALL THE FAMILY
NATIONAL ASSOCIATION FOR THE PREVENTION OF ACCIDENTS

Among the paper mill superintendents it would be hard to find such a specimen. The majority of good fellows in charge of paper mills in Wisconsin, at least, have been among the pioneers in the safety business and it becomes a matter of pride and pleasure to meet with them. There is just one danger and although I was born an optimist of the first class, I am always a bit afraid that when a machine runs along smooth and easy there is always some fellow who forgets the oil can and then we are liable to have trouble.

On account of your many duties connected with your daily task you may have trusted someone else with that oil can. Then when that fellow slips a cog some hideous accident happens. The very first thing you do then is to get hot like the dry machine. Remember, however, that we are all liable to make mistakes and getting hot makes things no better. Also remember the tea kettle. Though up to its neck in

hot water it continues to sing. Safety in a work shop is so very important that it takes the best man in the mill to guide it, and of course you are the best man. If you were not, and your gray matter did not exceed that of the ordinary fellow, you would not be in the important position you are holding now. So it is you that is responsible for the oil can and if it becomes imperative to hand it to the other fellow, see to it that this fellow is an enthusiast and has some idea of the responsibility of a safety engineer.

Accident prevention begins on top. There may be a few fellows here and there who are not only careful men but actually radiate some of that carefulness in their immediate corner or department. All hail to such men, but in a large plant you cannot depend on them for general results. The main battery that furnishes the safety current for the plant everywhere must be in the manager's office. The manager must make you feel at ease to handle this safety problem and you must be assured of his encouragement to the very limit. Upon that depends every measure of success to cut down that awful toll of accidents in paper mills or any other line of industry.

Do not tickle yourself by thinking that the problem is easy. You have a real one and unless you have a well defined plan you will not get very far. However, it is real work you are doing and it has many compensations. If you should become a bit weary, if the results seem too negative, just stop a moment and think of the human side of this problem. The noblest work of all is the work that will lighten the burden of mankind, and surely, if your efforts in safety work are all well directed, it must result in the prevention of many accidents to your fellow workers.

When you begin to study the causes of industrial accidents it becomes apparent that only a small number of them are due to the failure to provide safeguards. The larger percentage, some 80 per cent, are the result of unsafe handling of materials, of slipping and tripping, things falling from high places—fooling—scuffling and general unsafe practices. These things are the bone of contention in every shop and I take it a paper mill is no different. A great majority of these things can be prevented by teaching the man on the job to pay attention. This will be entirely ineffective unless this attention is sustained and if it is not repeated and in various ways accelerated, it will die a slow but sure death. Pep, enthusiasm and variety must mark a shop safety campaign in order to keep it alive all the time.

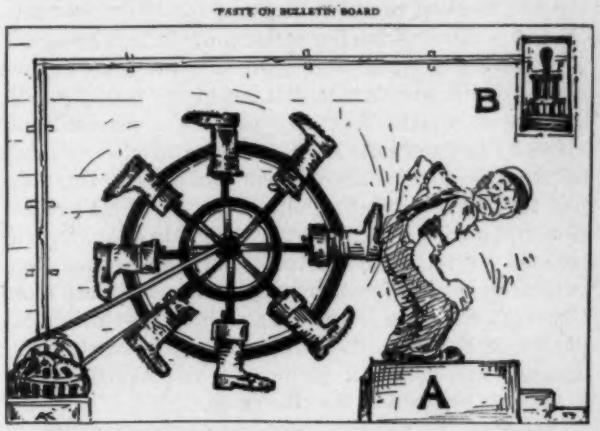
Special attention must be paid to the *new man.*

The green worker who is not instructed in the new job from the very beginning, will learn by bitter experience, and this means a bad page on the accident book.

If the new worker is a young man or still a boy a kind word occasionally will show that real interest is being taken in him by the superintendent, and will perhaps, save him from a trip to the hospital.

If the new employe is a clumsy fellow whose hands seem unable to fit any job, the superintendent's watchful eye must detect this and if possible change this man's work.

The question of sustaining interest in the safety campaign will call for all the wits of the superintendent or his safety engineer. The well located Bulletin Board, kept clean and alive with snappy safety posters will go a *long* ways to keep up the interest. And the superintendent's attitude towards this bulletin board means much. If he takes an interest in this class of education, the men will do the same. In my travels through hundreds of workshops I never saw this fail.



A man who gets his fingers in the way of a saw or loses his hand in a gear or falls from "a bum ladder" or loses an eye when grinding without goggles or neglects a small scratch and gets blood poison, feels like "kicking himself." Now "kicking yourself" is some job and it really seems impossible. However, with the aid of the Presto Self Kicker it becomes quite easy.

A superintendent who is naturally gifted with that fine diplomacy which "gets close to the men," will find much pleasure in good effective safety work. To take a worker to task for doing the wrong or unsafe thing before the whole crowd, perhaps roughly, is not half as effective as taking the man in a corner, and talking to him in a reasonable way. Do not forget that upon the human factor in this great problem depends the success or failure of the movement in your mill.

All in all, it becomes easily apparent that the superintendent's job is a real job and the industries of today are in crying need of real men to fit these jobs.

The wise superintendent will soon see that he must put sunlight into his safety work and when he does, he will notice that the warm rays of this "safety sun" will soon begin to play on the barometer of production, and result in considerable rise in registered results. Because safety first and production are inseparable. All this is highly important to you, as the high curve of production will indicate the measure of

(*Continued on page* 451)

Some Problems of Employment Managers

THE past two years have been eventful in the history of employment management.

It is well, while we take satisfaction in the birth of a new profession, to pause for a few moments for some rather sobering reflection. If this be a new profession indeed, as we believe it is and must be, because men who work in the twentieth century will demand as a right that they shall be supervised and aided by trained minds and humane spirit, we must be prepared to meet the various problems on this subject that are confronting our industry. This profession will not stand still during the years that you will be busy perfecting your technique, your apparatus, your relationship to the management and to the men. The fact that you stand in a unique mediating capacity, in the capacity of interpreter between management and men, will pledge you to make the effort to find an answer to the problems.

The most perplexing problems of the employment manager and which he finds most difficult to meet in a treatment of his labor difficulties are those of labor turnover and absenteeism.

Absenteeism is the antithesis of organization.

When all men are absent you have no organization. When the men are all present, physically and mentally, every day, some planning, some directing, some executing, then organization is the word we use to describe the condition which results.

In order to suggest a remedy, it is important to find the cause of the trouble. All of the many causes which have been stated may be grouped under a few heads. Hardly any of them are reasons, and most of them are mighty poor excuses.

The Safety First movement has entirely removed accidents as a reason for absenteeism and makes it a mighty poor excuse, owing to the splendid results that have been accomplished by the National Safety Council.

Illness in various forms, either of the workman or his family, has always excited our sympathy, but the doctors now are finding that it is better to keep a man well than to cure him.

Cures have depreciated, and an ounce of prevention is now worth several pounds of cure. If we are careful and moderate and properly advised we can avoid illness.

The chief cause is much simpler, and consequently can be more easily and rapidly eliminated than any of these. The principal excuse that men give for laying off is that they do not feel like working. There is no question that wages have generally increased more rapidly during the past year than the cost of living.

Still you find that the charts of progress and output show disconcerting variations from those desired. There is a spirit of uneasiness abroad, a restless tension in the air.

This gang is behind—because Jim, the regular leader, is not at work. That crew is slow because there are two new fellows on it.

When you go to the time office and check over clock cards, you find from 5 to 15 per cent of them not punched that day. Tomorrow approximately the same number of cards is not touched, but they belong to different men.

Those are the men you want to consider, the men on the payroll who work nearly every day, the men whose output is needed, who can work and should work, but who don't work; not the few who won't work, but the many who don't work.

The simple keeping of complete and accurate records of the men who are absent or tardy will help materially if the men know that the records are being kept. Most men are proud of a good record. If the question of steady attendance is sufficiently important to record it is also important to the man that no absences are recorded. That record is his reputation, and most men are careful of their reputation.

These records lend themselves to another use in helping combat the evil if they are published. The spirit of rivalry is keen and men, particularly in groups, are anxious and very quick to attempt to prove their superiority if they find that their excellence is recognized.

The results which can be obtained by properly induced competition between departments or squads are remarkable. In a plant employing 5,000 persons one department in which 500 men are engaged started an attendance campaign. The men were grouped in sections, and each week a report was published showing the total number of men in each section, the total number of man days which were possible, the total number actually worked, and the percentage of actual attendance. In addition the money value of these unworked days was shown. In January the attendance was 90 per cent, and the money value to the men of the hours lost was $4,300. In March the attendance was 94 per cent, while the money value of the hours lost was only $2,400. A New England concern employing approximately the same number of men has been using a somewhat similar plan, and their attendance for the last five months of 1917 averaged 97 per cent of the possible.

It is not fair to try to shift the burden of responsibility to the man. Remember that it is the job of the employment manager to know that it is essential for

every man to work every day—to believe in it, to practice it, and to convince others that it must be done. He then can make the idea of "every man on the job every day" a popular idea.

The best preventative for absenteeism is a thorough knowledge by the employment manager of psychology and job analysis.

"What has this got to do with the job analysis?" Simply this: To prevent the placing of "square pegs in round holes."

If the employment department is going to select pegs that fit and will stay put, it must know the dimensions and other characteristics of the holes that are to be filled—that is, the employment department must know the duties, the responsibilities, the compensation and the possibilities for each of the positions in the organization before it can set up its specifications for the kind of persons that should be secured to fill them. In other words, job analysis is the first step in preparing specifications for hiring.

There are several sources from which the information for job analysis may be secured and each source should be fully utilized, even though this may in cases mean some duplication of information.

First and foremost there is the original plan or intention of the management that assigns certain responsibilities and duties to the position.

The work in the paper industry being more or less specialized, although we have a number of jobs the duties of which are in common with other trades and occupations, call for a particular classification wherein the various duties to be performed for each job and the type of man to fill each particular job may be assembled. The employment manager with this data on hand will be enabled to pick the right peg for the right hole with greater accuracy.

The information may be collected through actual examination into the work being performed by the incumbent of each position. In securing this information from employes it should be checked by their superiors and be matched against the data independently secured by the manager.

These questionnaires, as they might be called, should contain a series of questions on the duties of the positions analyzed and are sent to the incumbent of each position. It will be found that the usefulness of the answers received will depend upon the thought and care taken in selecting the questions.

There are many benefits, both direct and indirect, which should result from a thoroughgoing job analysis, as the employment department secures a systematic and accurate record of the duties, responsibilities, compensation and possibilities for each position. Lines of authority and duties, which before were perhaps vague and uncertain, are definitely established. Wage and salary schedules are more completely standardized. Blind-alley jobs are discovered and regular lines of promotion are established.

As soon as you have the job analysis you have the first working tool of the interviews; if you know what job you have to fill, then you can start out and find the man to fill it.

When you come to fitting the man to the job you run into a rather unknown quantity, because we have been depending upon the general experience of men who as interviewers concentrated their previous mechanical experience at that point in the interest of the organization. You usually only cover four general needs: (1) The personal desire of the man, (2) his personality, (3) his trade knowledge, and (4) his skill. Of course the importance of each will depend entirely upon the job; they will have to be balanced to get the result you are seeking. To work that out on a uniform basis it is necessary to have a measuring instrument of some kind. The judgment of the interviewer has been the measuring instrument.

When an interviewer gets through with the question of trade knowledge the sole remaining question is that of skill—that is, as to how expert the man is who knows all these things about a job, and whether he has been primed by some one and is there simply answering, parrot-like, questions that he has already been informed on. The only way finally to check that is by measuring his skill, and, of course, that is finally determined by the performance of the man for the first day or first week or first month.

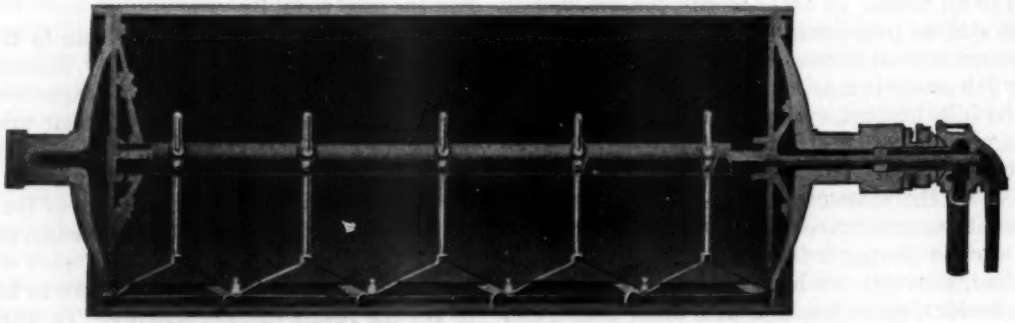
Progress in Paper Drying

By ARTHUR G. MAURY

PULP and paper mills have a very important problem to solve and one which has almost an unlimited effect on the production and economy of paper manufacture. This is the drying system.

The one great obstacle to be overcome is the accumulation of the water of condensation in the dryers. Perfect and economical drying is only possible when the steam is permitted to come into immediate contact with the dryer shell. Some device free of cockles when the dryers show a wide variance of temperature.

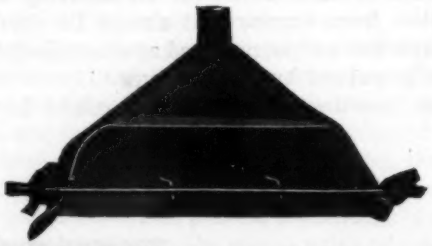
In order to overcome these recognized defects in drying systems, inventors have tried to work out a means by which the water of condensation could be removed by buckets, but while improvements were made on the old system, because these buckets lifted the water and therefore made it unnecessary to build up such high pressures as needed with a siphon, they could take the water from one end of the dryer only



therefore is necessary for continuously eliminating the condensation. With rapidly rotating dryers, it is evident that centrifugal force carries the water around the dryer shell, forming a film of water which covers the wall of the dryer. This film of water acts as an insulator, forcing the steam to heat the water.

Until the last eight or nine years the only method that had been used with any degree of success to remove the water of condensation from paper machine dryers was the siphon. This system, as every mill man knows, was not very satisfactory for drawing out the water, owing to the fact that the siphon pipe can not come but within a very limited distance of the dryer shell, an appreciable amount of water must always remain in the dryer. Then too, in order to start siphonic action it is necessary to either use suction, or else rely on the steam's pressure to break the air cell at the base of the siphon pipe. This means that in an ordinary nest of dryers, there are not two dryers emptied, as far as a siphon can empty them, at the same time, so that there can not be two dryers at the same temperature at the same time in the whole nest of dryers. Because of this ununiform temperature the machine can not be speeded up to its maximum capacity as then the sheet would come off the machine with wet splotches, streaks and edges and it is impossible to get a sheet and therefore uniform temperature across the entire length of the dryer could not be maintained.

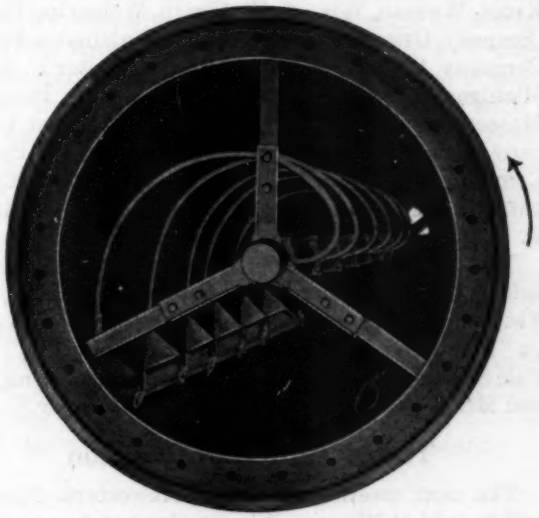
Otis W. Dodge, one of these inventors, after experimenting for many years devised a scoop to lift the water from the dryers. He went still further, however, and applied in his scheme central discharge pipes in conjunction with the scoops which system



he named the Dodge Gravity Evacuator. Instead of a single scoop he used a series placed across the dryers, each scoop measuring about 15 inches. As an example, in a 90-inch face dryer, 6 scoops are used. These scoops drain through a convolutedly bent pipe so constructed that the water can not run back into the dryers. The scoops are fastened to the base of the dryer by forged steel studs and are held in place by a spring rod running over a groove in a slot in the scoop, giving sufficient play to allow for contraction or expansion due to cooling and heating of the dryer.

As the dryers revolve the scoops pick up the water of condensation as rapidly as it forms and drain it into the central discharge pipe, thence into steam joints to the discharge headerpipes, where large float traps are utilized; one trap to every nine dryers.

Like any new machine or device in its early stage the Evacuator, though it proved to be right in principle, showed mechanical defects which somewhat detracted from its repute, but with its constant use over a period of nine years it has been developed to a point where all wearing parts are entirely elimi-



nated, and the material now used is such that no electrolytic action or other causes can affect its quality and strength, so that when once put into a dryer its life is as long as that of the dryers itself.

After having made many tests on machines before and after installation the following summary was tabulated and will give an idea of the steam saving and increased production (divided into separate classes of paper), due to the application of this device:

POUNDS OF PRODUCTION PER SQ. FT. OF DRYING SURFACE

Class—	Before Installation Pounds	After Installation Pounds	Increase Per Cent
News Print	0.744	0.908	22
Book Paper	1.101	1.196	9
Writing Paper	0.675	0.808	20
Tissue Paper	0.543	0.630	16
Wrapping Paper	0.943	1.142	21
Box Board Paper	0.666	0.806	21
Insulating Paper	1.220	1.490	17
Sulphite Paper	1.022	1.148	12

POUNDS OF STEAM USED TO DRY 1 POUND OF PAPER

Class—	Before Installation Pounds	After Installation Pounds	Decrease Per Cent
News Print	3.49	2.18	38
Book Paper	3.03	2.42	20
Writing Paper	2.93	1.75	28
Tissue Paper	4.05	3.02	26
Wrapping Paper	3.47	2.60	25
Box Board Paper	3.25	2.25	38
Insulating Paper	3.39	2.95	13
Sulphite Paper	1.71	1.19	31

The economy of this equipment over the old systems may be understood when it is pointed out that a saving of 15 per cent of the coal used for drying and an increase of 10 per cent in production based on an average cost of coal and profit on the paper, will be over $1.00 per ton of production. It is estimated from a large number of installations that it will pay its initial cost in a period of about nine months, so that a yield on the investment of 125 per cent on the first year is represented.

Are You Oiling the Safety Movement?

(*Continued from page* 447)

success you have attained in mill management as judged by the man in the "inner sanctum."

You may always reach your men in the interests of safety by visualizing what will happen to his family at home if the man on the job is not safe. Safety means his very happiness and that of the folks at home. And many a man with red blood and a normal heartbeat will do the safe thing for the little woman at home and for the kiddies who are waiting at the gate for Daddy's safe return, after the day's work is done, when he cannot be reached by any other method.

The superintendent whose heart is in the right place (and there are many such) will gladly give his best efforts to the safety of his fellow men. The more interest he takes in promoting their welfare, the better work they will want to perform for him.

I wish to congratulate those who are now doing this work so well and more strength to those who are "thru considering" and are "wading in."

The American Pulp and Paper Mill Superintendents' Association News

The Meeting of the Michigan Division, the Wausau Meeting and Other Coming Events

THE combined dinner, smoker and meeting of the Michigan Division held at the Park-American Hotel, Kalamazoo, on August 19 proved to be such a successful event that it was decided by the Division to hold meetings of this character every month hereafter.

After the dinner the meeting was called to order by Chairman Ed. T. A. Coughlin, who gave a brief outline of the aims of the association and called for the reading of the minutes of the previous meeting by the secretary-treasurer, Mr. George A. Pountain, which brought out the rapidity with which the division was growing. Peter J. Massey, secretary-treasurer of the National Association, reviewed briefly the meeting of the association at Green Bay, Wis., and extended an invitation from Mr. Cunningham, chairman of the Northwestern division, to attend the next meeting at Wausau on October 4. C. W. Ulrich, of the Bardeen Paper Co., told his version of the Green Bay meeting and the benefits that were derived therefrom by every superintendent that attended that meeting.

The speakers' program was an exceptionally good one and consisted of three addresses; Al Kroes on "The Safety Movement," H. T. Spaulding on "Paper Mill Illumination" and A. H. Pritchard on "Paper Mill Lubrication." Following the three addresses, a general discussion in which there were numerous valuable points brought out and amplified by the speakers, such as various means that should be adopted to make a real live safety first organization, the value of proper upkeep and maintenance of lighting units, the proper means of illumination for calenders, stacks, the saving in power by correct methods of lubricating a paper machine and the saving in "broke" by properly lubricating the calenders.

The list of those present was as follows: Ed. T. A. Coughlin, chairman; Luther A. Parker, vice-chairman; George H. Pountain, secretary-treasurer; N. M. Brisbois and F. W. Sutherland, Sutherland Paper Company, Kalamazoo; C. H. Noble, Bardeen Paper Company, Otsego; W. J. Lawrence, Kalamazoo; C. O. Thorne, Watervliet Paper Company, Watervliet; C. H. Walgamood, A. H. Pritchard, Chicago; Jacob Parent, Western Board & Paper Company, Kalamazoo; Alfred Bryant, Bryant Paper Company, Kalamazoo; Frank A. Johnson and Jacob Kuss, King Paper Company, Kalamazoo; E. E. Johnson, Wheat Paper Company, Elkhart, Ind.; John P. Cooney, Peninsular Paper Company, Yysilanti; John F. Driessen, Kalamazoo; H. T. Spaulding, Cleveland, O.; Al. Kroes, Wausau, Wis.; C. W. Ulrich, Wolverine Paper Company, Otsego; Peter F. Denner, Kalamazoo Paper Company, Kalamazoo; W. I. Fell and Walter E. Sooy, Michigan Carton Company, Battle Creek; Peter J. Massey, Chicago; E. H. Gilman, Bryant Paper Company, Kalamazoo; S. W. Simpson, McSimBar Paper Company, Otsego; J. H. O'Connell, King Paper Company, Kalamazoo; Bernard Benson, Elkhart, Ind.; F. B. Eilers, Kalamazoo; Alex McVie, Kalamazoo.

The next meeting of the Michigan division will be held at the Park-American on September 15 at 6 p. m. The speakers for this meeting will be Mr. F. F. Vater on "Water and Power Wastes in the Paper Mill," Mr. Cale Stickle, on "Paper Drying and Power Economy" and Mr. C. W. Reiser on "The Sizing of Paper."

The Northwestern Division

The next meeting of the Northwestern division will be held at Wausau, Wis., on October 4 and a very interesting program has been prepared, which will consist of three very valuable papers, "The Manufacture of Sulphite Pulp," by Mr. D. F. O'Connell, chairman of the sulphite committee; "A Standard Chip Board," by Mr. Henry Bert, chairman of the paper board committee, and "System in the Paper Mill," by Mr. W. T. Shmitt, of the American Writing Paper Co.

You cannot possibly afford to miss these three very valuable papers, prepared by practical men who are specialists in their line of endeavor and have devoted many years of work and study to overcome the various problems in their several lines.

Mr. D. F. O'Connell is one of the most prominent Sulphite Superintendents in America, and has developed a considerable number of the successful sulphite superintendents in this country today.

Mr. Henry Bert is a pioneer in the Box Board field, and has been a leader in the modern manufacturing methods of this commodity. He is particularly qualified to speak on this subject, having had experience with the various methods used in the east, middle west and Pacific coast sections of the country.

Mr. W. T. Shmitt has always been an enthusiastic leader in the cost movement, and has received special commendation from the Cost Association of the Paper Industry for the system he has worked out and in-

(Continued on page 456)

Fall Meeting of the T. A. P. P. I.

Chicago, September 24-27, 1919

THE fact that Chemistry has been particularly in demand for the last four years has made us all a little wiser in the appreciation of its value than we have been in the past. We now realize more than ever to what extent the success and prosperity, not only of our own industry, but every industry, depends upon scientific chemical knowledge.

If the American Chemist has been of such great assistance in winning the War when he had to begin from the very foundation while competing with a Nation that represented the very last word in chemistry, how much more will he be of assistance to us now that his improved knowledge of applied organic chemistry can be made available to the problems of industry.

In choosing the Chemical Exposition as the place for its fall meeting, thereby giving the members an opportunity of reviewing the latest developments in chemistry and attend the deliberations of many other scientific organizations, who are holding their meeting simultaneously, the officers of the T. A. P. P. I. have used good judgment and perspicuity.

The Program

The meeting will open on Wednesday morning, September 24, with registration at the Association Headquarters, in the afternoon the following papers will be presented to the members:

Utilization of Waste Sulphite Liquor as Fuel.—By Prof. Ralph H. McKee and George Barsky.

Losses of Soda in the Evaporation of Black Liquor.—By O. Bache-Wiig.

Improved Methods of Handling Waste Liquor from Digesters and of Cooling SO_2 Gas from the Burners.—By H. G. Spear.

A Continuous Sedimentation Process for Ground Wood Pulp.—By Fred A. Naegli, chemist of the Watab Pulp & Paper Co.

Wednesday evening, banquet at Union League Club.

On Thursday, September 25, the Association will be the guests of Sears, Roebuck & Co. at a luncheon, after which a tour of the extensive plant, including the paper making department, will be made.

Thursday evening, smoker at the Union League Club.

The entire third day, September 26, will be spent at Madison, Wis., inspecting the pulp and paper branches of the Forest Products Laboratory under the guidance of Carlisle Winslow, Otto Kress and Sidney Wells.

The last day, September 27, will be spent at the

(*Continued on page* 469)

High Grade
Bleached
Sulphite Pulp

Furnished in Rolls—75% Air Dried or in Wet Laps

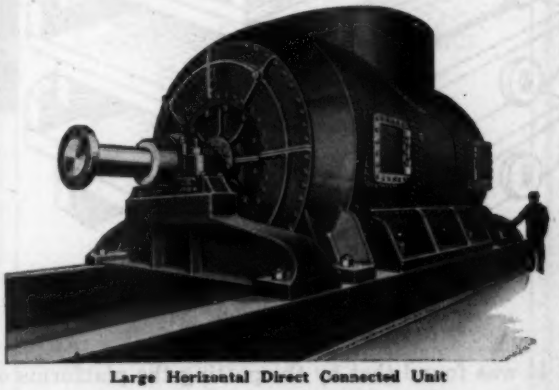
Write for Samples and Prices

Eastern Manufacturing Company
501 Fifth Avenue New York
Mills at Bangor and Lincoln, Maine

Leffel Turbine Water Wheels

High Speed — High Horsepower — High Efficiency

Vertical and Horizontal Designs

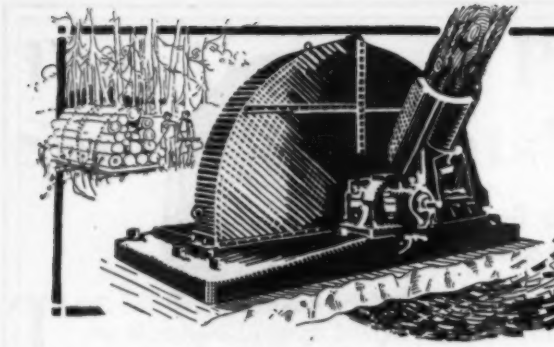


Large Horizontal Direct Connected Unit

Write for Bulletin 54

***The* JAMES LEFFEL & CO.**
SPRINGFIELD, OHIO

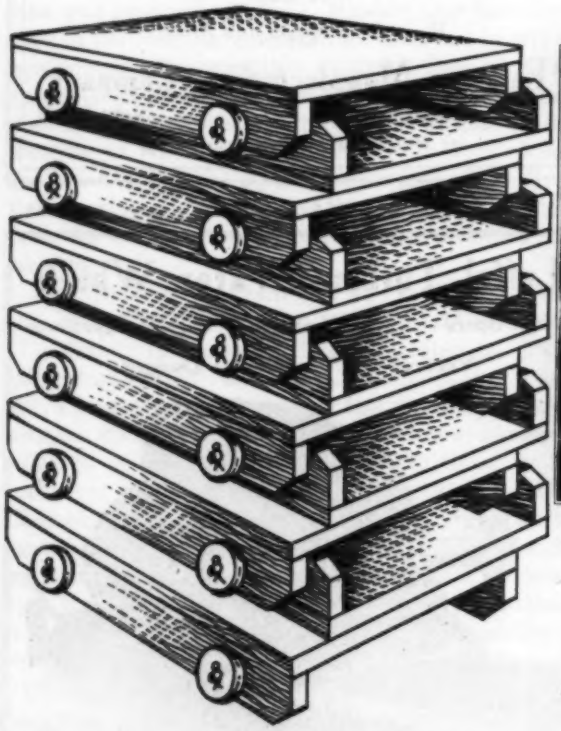
SALES ENGINEERS
B. F. Groff, 558 Woolworth Bldg., Lancaster, Pa.
L. B. Dow, Inc., 79 Milk Street, Boston, Mass.
H. H. White, 1503 Fourth Nat'l Bank Bldg., Atlanta, Ga.
William Hamilton Co., Ltd., Peterboro, Ont., Canada.



Chips of Information

Rollers Under Your Lift Truck Platforms

With the universal use of lift trucks in paper mills, printing and lithographing establishments, any device that will increase their usefulness and efficiency will be of interest. The accompanying sketch shows an idea that was put into effect in a large printing establishment where a number of trucks are continually moving stacks of trays to and from the pressroom.



It was found that by the putting the platforms of wheels, considerable time and delay was saved on the presses, as it eliminated the necessity of waiting for the truckers, when busy elsewhere.

By pushing the stack of trays or pile of paper back in a straight line enough space was gained to lay another platform and start another pile of trays going without any delay or loss of time.

Overhead Trolley Systems

Loading and unloading trucks with rolls and bundles of paper is of considerable importance in the cost of operation. By reducing the loading and unloading time, it will be possible to increase the number of loads handled even though it may, perhaps, entail the same amount of labor.

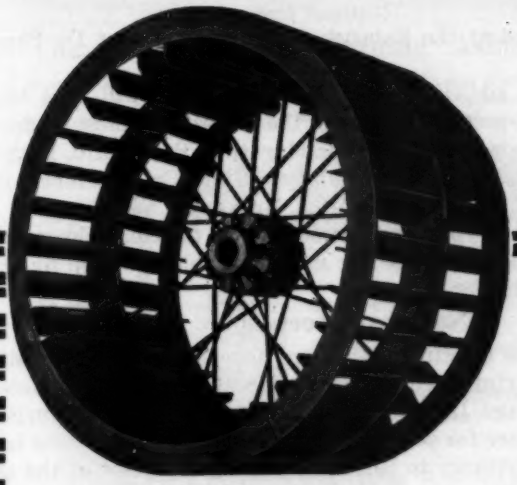
While there have been several ways of handling this problem shown in these columns, one of the most successful methods of handling is depicted here, for

the first time, although it has been in satisfactory operation in a number of plants for some time.

An overhead trolley system, with extensions, will load, unload and pile your product with greater economy than most any other method.

It will lift your heavy unwieldy rolls of paper with no hesitancy or uncertainty of action and carry it high up overhead with smoothness and speed without cluttering up your aisles or interfering with the work in any way. It delivers the load easily and steadily, without straining or vibration, piling it as high as desired and accomplishes its work without damaging the paper in anyway.

With a good system of this kind you will be able to save a large amount from the elimination of "busted" edges in your rolls and bundles of paper.



Bayley Equipment FOR The Paper Industry

OUR organization has had extensive experience in meeting the heating, ventilating and drying requirements of paper mills.

We design, manufacture and install equipment which will give most efficient service in your mill.

Forced and Induced Draft Systems, Pneumatic Chip Ash Handling Systems, Cooling Systems for Electric Generators and for Calenders, Absorption Systems, Forced Ventilating Systems, Dust Collecting Systems, etc., are among the successful applications of Bayley Equipments to paper mill needs.

An inquiry mentioning your special requirements will bring you interesting information

Bayley Manufacturing Co.
732 Greenbush St. Milwaukee, Wis.

Manufacturers of Heating, Ventilating, Drying and Conveying Systems.

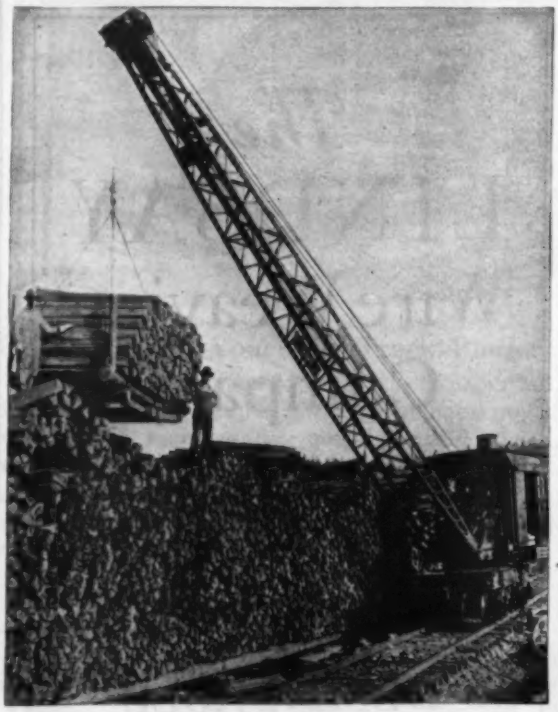
The LINDSAY Wire Weaving Company

Manufacturers of
DEPENDABLE FOURDRINIER WIRES

Cylinder Covers and Other Paper Machine Wire Cloth

All Well Made at

Collinwood Station CLEVELAND OHIO



Handling Materials at the Mill

IS YOURS one of the many mills which handles considerable pulp? Some of these have found it to be more rapid and economical to do this handling with a Brownhoist locomotive crane. A Brownhoist will not only place the pulp wherever it is needed, but will handle your coal, switch the cars and take care of innumerable jobs which come up around the yard. If you have much handling to do, our long crane experience should be of use to you. We will gladly give you any information for the asking.

The
Brown Hoisting Machinery Co.
CLEVELAND, OHIO, U. S. A.

Engineers and Manufacturers of Heavy Dock Machinery Bridge Cranes, etc., as well as smaller Cranes and Hoists

Branch Offices in New York, Pittsburgh, Chicago and San Francisco.

(Continued from page 452).

stalled at the Babcock & Shattuck Mill at De Pere, Wis.

In addition to this program there will be a trip of inspection to three of the largest and most modern mills in the U. S. The Marathon Paper Mill, Rothschild, The Wausau Sulphate Fibre Co., Mosinee, and The Wausau Paper Mills, Brokaw.

Make your arrangements now to attend this meeting, as it will be the most valuable one held by the association.

National Meeting at Chicago

The meeting of the American Pulp and Paper Mill Superintendents' Association at the Congress Hotel, Chicago, Ill., on Nov. 6 and 7, will have many suprises in store for you, and as this meeting will be your last opportunity to become a Charter Member of the association, it is important that you file your application immediately.

The reception committee for this meeting is making rapid progress in its work, and will soon issue the full program of what is being prepared for the superintendents.

Take due notice of the change in date which was made necessary to prevent this meeting from conflicting with the meeting of the American Pulp and Paper Association, the week of Nov. 10 in New York.

Remember the new date for the Chicago meeting is November 6 and November 7.

News Personals

Emanuel Salomon, president of A. Salomon, Inc., dealers in paper mill supplies at 15 Park Row, and president of the local association of waste material merchants, has just returned from a three months' trip to Europe in the interest of his firm.

C. J. Lauer has succeeded J. C. Deery as head of the staff of general salesmen in the local office at 200 Fifth avenue of the Seaman Paper Company, of Chicago.

The Flambeau Paper Co., has acquired the Ashland Sulphite Pulp Mill of The Menasha Printing & Carton Co., and is making extensive improvements to its Park Falls holding, the most important of which is the building of a new Sulphite plant.

John F. Byrnes, formerly general superintendent of the Michigan Carton Co., has been engaged as general manager of the Standard Paper Co., Kalamazoo.

The Northern Paper Mills, Green Bay, Wis., have begun work on the construction of three new buildings, which will increase the present capacity of the mill by 90 tons a day and will involve an expenditure of $250,000.

The RIGHT Way to Handle Ashes

Power plants at progressive paper and pulp mills are eliminating their ash wheelers and installing American Steam Ash Conveyors. Over 66 mills now are American equipped.

AMERICAN STEAM ASH CONVEYORS

are labor saving. First cost low, maintenance small, operating cost but a few cents per ton of ash handled.

Engineering details are in Catalog P. Free on request.

American Steam Conveyor Corporation

Ash Disposal Engineers

CHICAGO, 326 W. Madison St.
NEW YORK, 110 W. 40th St.

Sales Engineering Offices in Principal Cities

Papers that draw Trade!

A Second Palaver On Paper

By ELBERT HUBBARD II

This being an account of a visit to Parchment by Elbert Hubbard II and Freddie—the introductory lap of which was taken "astride a bucket of gasoline" as Bert puts it. But drop us a letter for the NEW BOOK now being done a la Roycroftie. KVP products edge into the dope very interestingly. When you express your reluctance to get along without this "Second Palaver" you might at the same time tell us what you need in vegetable parchment, waxed and bond papers.

KALAMAZOO VEGETABLE PARCHMENT COMPANY
KALAMAZOO, MICHIGAN

World's Model Paper Mill

Makers of bond and waxed papers and vegetable parchment

SOLUBLE AMERICAN BLUE

BINNEY & SMITH CO.
81-83 Fulton Street NEW YORK

STORM & BULL, Inc.

2 Rector Street, New York

EXPORT

All Grades of

WRITING BOOK
NEWS WRAPPING

PAPERS

OFFERS SOLICITED

WE-FU-GO AND SCAIFE

WATER

PURIFICATION SYSTEMS
SOFTENING & FILTRATION
FOR BOILER FEED AND
ALL INDUSTRIAL USES

WM. B. SCAIFE & SONS CO., PITTSBURGH, PA.

WAUSAU SULPHATE FIBRE CO.
MOSINEE, WISCONSIN
TRADE MARK
COPYRIGHTED

Cut down *excessive* wrapping paper investment. Why carry two wrapping paper lines for one wrapping paper *purpose?*

MOSINEE

presents a perfect wrapping paper, weight and strength for each wrapping purpose. Made in all weights from 15 pounds to 100 pounds basis. The one complete, standardized and economical line of wrapping paper sold.

Mosinee Kraft

"The Wrapper that Delivers the Goods"

How to Distinguish Douglas Fir

Douglas fir and Sitka spruce are frequently put to the same uses, but they do not have exactly the same properties. This fact makes it desirable to have a ready means of identifying the lumber of these species. The use of the following key prepared by the Forest Products Laboratory should help in telling the two woods apart:

General Characteristics.—Douglas fir is darker in color than Sitka spruce, and has more pronounced annual rings. Of the two, Douglas fir is decidedly the more resinous.

Color.—The color of Douglas fir, as seen on a freshly cut longitudinal surface, is orange-red to red; that of Sitka spruce is pale pinkish brown. The color varies in both species, however, so that the darker spruce is about the same as the lighter fir. There is a marked contrast in color between the heartwood and sapwood in Douglas fir; in Sitka spruce the difference is less pronounced, both being quite light in color. Douglas fir is not so lustrous as Sitka spruce which has a very noticeable "silky sheen."

Annual Rings.—In both species each annual ring is made up of a light, soft band or layer, known as springwood, and a dark, dense band known as summerwood, the summerwood being on the side toward the bark. In Douglas fir the bands of summerwood are usually very conspicuous and clearly defined from the springwood, but in Sitka spruce the springwood merges gradually into summerwood.

Resin.—Douglas fir is more resinous than spruce and often shows abundant exudations on cuts made before the lumber was seasoned. Such exudations of resin are scarce in spruce.

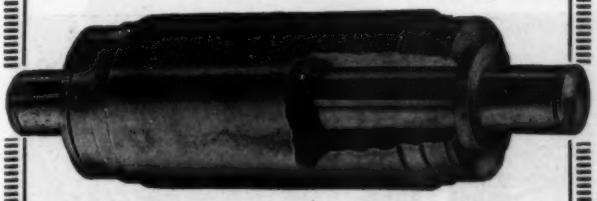
Tangential Surface.—Tangentially split surfaces (surfaces made by splitting along the rings) of Sitka spruce usually have numerous slight indentations giving it a "pocked" or dimpled appearance never found in Douglas fir. This characteristic is more pronounced in spruce with narrow annual rings and may be missing entirely in wide-ringed material, especially that near the center of the tree. Therefore, this observation should be made where the rings are narrowest. Occasionally the eastern spruces also show this uneven tangential surface to a slight extent. Some trees of western yellow pine also develop a "pocked" appearance of the wood, but the pine can be distinguished by the larger and more numerous resin ducts.

Bark.—Pieces of bark, if found on the lumber, afford a reliable means of distinguishing between Douglas fir and Sitka spruce. Douglas fir has a thick bark with characteristic whitish layers. Spruce has a thin bark without whitish layers.

Cell Walls.—With the aid of a compound microscope, Douglas fir can easily be distinguished from Sitka spruce. Douglas fir has spiral thickenings on the inside of the cells similar to the thread in a nut, but the cell walls of spruce are without such spirals.

PERKINS

PATENTED



Paper and Cotton Calender Rolls

¶ The unique construction of these rolls distinguishes them from any other make and creates certain definite advantages which are readily apparent to the roll user. If not already familiar to you—

LOOK THEM UP

B. F. PERKINS & SON, Inc.

HOLYOKE MASS.

The C. L. La Boiteaux Co.

Cincinnati Chicago Cleveland New York

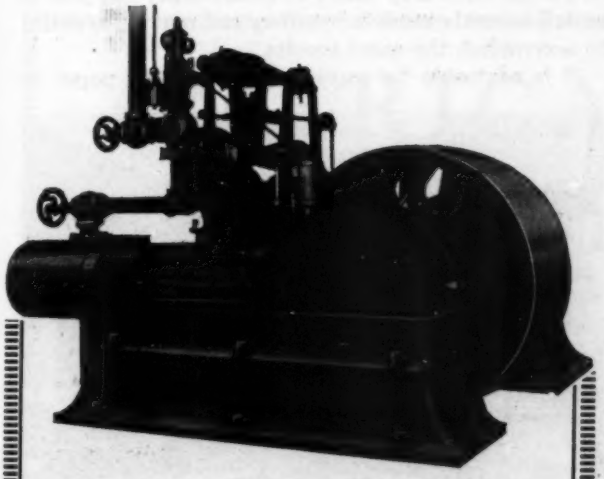
TRADE MARK L X QUALITY SERVICE

PAPER BOX BOARDS

— FOR —

Folding Boxes, Set up Boxes, Paper Cans, Shipping Containers, Etc.

Plain Strawboard
News Lined Strawboard
Book Lined Strawboard
Plain and Lined Chip Board
Single and Double Manila Lined News and Chip Board
Patent Coated Folding Box Board
Clay Coated Folding Box Board
Solid Manila Tag Board
Brown Jute Box Board
Oak Grained Jute Box Board
Marble Grained Jute Box Board
Pasted Container Board
Bristol Ticket Board
Diamond Wall Board
Champion All Leather Heel Board
Also other standard and special grades to order



Variable and Constant SPEED ENGINES

Paper Mill Economy is assisted very materially by the installation of High Grade Variable Speed and Constant Speed Engines.

Send for List of Installations and Catalogs

CHANDLER & TAYLOR COMPANY
Indianapolis, Indiana

White's Chipper Knives

Don't take our word for it. Ask any of the larger mills what they know of our chipper and paper trimming knives.

THEY WILL SAVE YOU MONEY

Get Our Prices

The L. & I. J. White Co.
85 Columbia Street, BUFFALO, N. Y.

WANTED

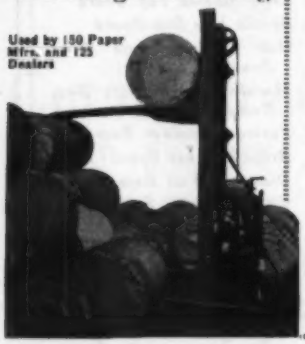
Copies of the APRIL and MAY Numbers of *THE PAPER INDUSTRY*, in Good Condition at 20 Cents per Copy. Edward B. Fritz, Publisher, 501 Monadnock Block, Chicago, Ill.

"NORTHERN" Cranes and Hoists

Northern Engineering Works Detroit, Michigan

ECONOMY System of Storage Handling

Used by 150 Paper Mfrs. and 125 Dealers



Makes One Man Equal to Three

Sheer muscle power is not enough for piling heavy roll paper. "Reach" is needed, too. The Economy System provides both. It enables one man to lift as much as two thousand pounds right up to the ceiling and then push the roll into place. We want to tell progressive manufacturers and dealers more about this money-saving system.

Write for particulars

Economy Engineering Co.

2635 W. Van Buren St., Chicago, Ill

NEW YORK ATLANTA DETROIT SAN FRANCISCO

BOLTON QUALITY

WHERE YOU SEE THE ONE

YOU WILL FIND THE OTHER

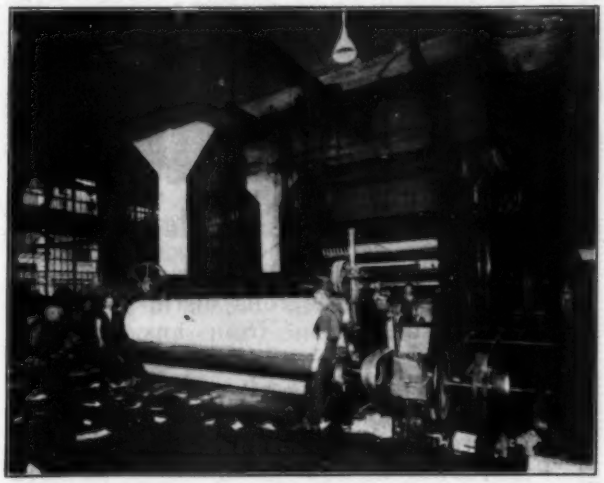
JOHN W. BOLTON AND SONS, Inc.

Lawrence, Mass.

KNIVES

Handling and Moving Paper

Every man in and about your plant who is pushing or pulling trucks is a non-producer. By adopting some mechanical means of handling and moving your



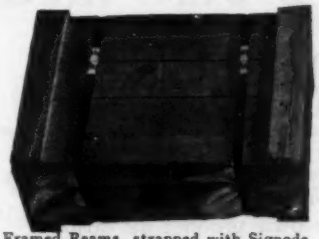
material, it will enable you to place these men in positions where they can perform productive labor.

Traveling cranes and monorail electric hoists, which can be used to advantage in your plant for the moving of material in any direction and which serve different parts of your plant, are very valuable to you as they may make it unnecessary for you to install several complete handling and moving systems to accomplish the same results.

It is advisable for any concern handling paper or

paper products to investigate closely the various systems that are available before making the final selection. When it is finally decided to install a certain system, take your superintendents into your confidence and see if there are any refinements that they can suggest which will apply to your own particular needs and make the system you have adopted doubly efficient.

SIGNODE SYSTEM



Framed Reams, strapped with Signode System

The Signode System delivers Framed Reams, Cases and Bales of Paper with the square corners in perfect condition.

Write for Particulars and Prices

The Signode System, Inc.
564 W. Adams Street CHICAGO, ILL.

Plate Press Felts

There is no better Plate Press Felt made than the "HAMILTON."

A trial is invited.

Satisfaction always guaranteed.

SHULER & BENNINGHOFEN
HAMILTON, OHIO

WOLVERINE
Paper Company

"Wolverine" Waxed Papers for Every Requirement

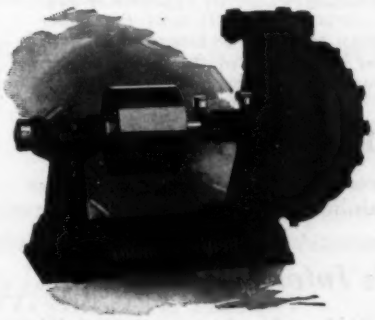
Best Quality

Waxed Tissue a Specialty

OTSEGO, MICHIGAN

AMERICAN-MARSH
Centrifugal Pumps

BELT OR MOTOR DRIVEN

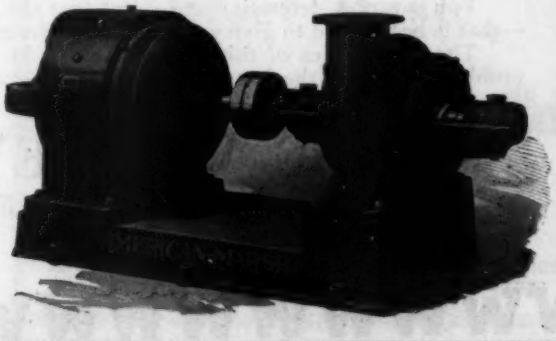


Extra wide ring oiled bearings. Overhanging casing allowing the discharge to be taken at any angle desired. Removable outer head so that impeller may be withdrawn without disturbing the casing. Hydraulically balanced impeller insuring minimum end thrust. Impeller machined all over and turned to make a close running fit with the casing.

Finished with open runner for handling paper stock.

INVESTIGATE. ASK FOR BULLETIN No. 25.
Furnished Promptly Upon Request.

We Also Manufacture **Power Pumps, Deep Well Pumps, Boiler Feed Pumps, Vacuum Pumps, Horizontal Power Air Compressors.**



American Steam Pump Co.
Battle Creek, Michigan
Chicago Office, 1220 Monadnock Block.
New York Office, Whitehall Building, 17 Battery Place.

Now You Can Know—Don't Guess

—if you **test** every piece of material that goes into your product, and **know** it is the best obtainable for that purpose

—if you **test** your own product at various stages of its manufacture, and **know** its physical properties are all you want them to be, and **all your customer expects.**

—if you **test** all your Felt, Rubber, Machine Wire, Wire Screen, Leather—all material—the physical functioning of which affects the quality of your output

—**then** you **know**

—**then** you protect the reputation of your finished product.

WIDNEY MODULIMETER
A TEST
PATENTS PENDING

This Instrument Measures Every Physical Property of Paper

The Widney Modulimeter measures the Thickness, Tensile, Tearing, and Folding Strength, Hardness, Resilience, Elasticity, Stiffness, Smoothness of Surface—every physical property of paper, giving the results in figures—on the dial, so you know immediately and definitely. Tests can be made machine-wise or crosswise.

The Widney Standard is a great step forward. It puts the paper maker where he can deliver precisely what he contracted for. It tells the paper buyer **what** to specify, and informs him what he **gets.**

Let us send you **The Story of the Modulimeter.** You'll find it intensely interesting and practical.

Shows the Life of Felt, Leather, Rubber, Etc.

Scientists and manufacturers know that the **power to recover** ("Life") of any material is of the utmost importance, since it directly indicates a material's ability to endure, or wear, under all sorts of conditions.

The Widney Modulimeter Gives This Information

You can now determine and select just the **quality** of Felt, Rubber, Leather—any material —that is best suited to give you desired results in your mill.

The possibilities of this instrument can be appreciated only by applying it to your own problems. Tell us the factor you want to determine and we'll tell you how to do it.

THE WIDNEY COMPANY

Testing Engineers

Main Office and Laboratories: 352 So. Jefferson St., CHICAGO, ILL.

Hall, Ward & Walker
(INCORPORATED)

We Guarantee

¶ Standard news with less than 10% Sulphite, a yield of more than 2200 lbs. per cord peeled or prepared wood and at less than 65 H. P. per ton.

¶ Installations made without interruption of manufacture and for time of men and expenses only. No charge whatever unless guaranty fulfilled. License fee 10% of saving made or 20 cents per cord at licensee's option.

HALL, WARD & WALKER, Inc.
Sherman Building
WATERTOWN, N. Y.

Ticonderoga Machine Works
TICONDEROGA, N. Y., U. S. A.
MANUFACTURERS OF
WARREN IMPROVED CALENDER DOCTORS
With Flexible Blades, Universal Adjustment and Control
(PATENTED)
WARREN IMPROVED PATENT DOUBLE DRUM WINDERS
Patent BALL VALVE Hydrant
Stock Circulating Systems *and*
other Paper Mill Specialties
SEND FOR OUR BULLETIN

H. O. NUMAN

Barking Drums

Green Bay, Wis.

CHAS. A. DEWING, President
A. G. GILMAN, Vice-Pres. and Gen'l Mgr.
JOHN A. PYL, Sec'y and Treas.
JOHN W. POWELL, Sales Manager

1919
THE RECONSTRUCTION YEAR

YOUR LINES can be
strengthened by adopting

Monarch Standardized Lines

CIS Litho, Label and Music
Ideal Enamel
Mohawk Enamel
Utility Enamel
Mastercraft Enamel

OFFSET PAPERS:

Bulking Eggshell
Offset Music

Monarch Paper Co.
Kalamazoo Mich.

3 Paper Machines **15 Coating Machines**

GATTI-McQUADE COMPANY

JOSEPH GATTI, *President*

Established 1894 Incorporated 1898

Tell Us Your Problems in

Paper Manufacturers' Supplies

¶ We have the EQUIPMENT to handle any TONNAGE you may desire.

¶ We are in a POSITION to give you the exact GRADE you require.

¶ Our CAREFUL GRADING assures you of UNIFORMITY.

¶ Our SORTING is done under SANITARY conditions in 2 large MODERN WAREHOUSES.

Every Standard Grade of

Rags, Paper Stock
Cotton & Woolen Waste

We also carry a full line of

Kraft, Sulphite, Manila and Waterproof Wrapping Papers.

Straw, Binders, Chip, Lined and Coated Box Board.

Cotton, Hemp and Manila Cordage.

GATTI-McQUADE COMPANY

JOSEPH GATTI, *President*

Main Office: 200 Fifth Ave., New York City

WAREHOUSES:

Hoboken, New Jersey, Weehawken, New Jersey

Philadelphia Office: 1416 Wood St.

Bardeen Paper Co.

Otsego, Mich.

Printing Papers of Merit

For LETTERPRESS, OFFSET *and* LITHOGRAPHIC PRINTING

Offset Blanks Offset Bristols

Porcelain, Peninsular and Purity Enamel Book

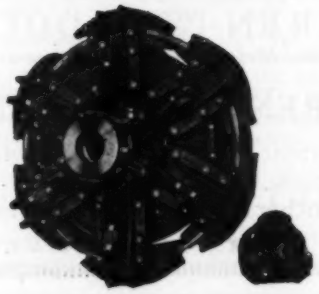
M.F. and S&SC Book and Catalog

English Finish Opaque

Coated Blanks

Post Card Translucent

THE HILL CLUTCH CO.



Hill Friction Clutches

(SMITH TYPE)

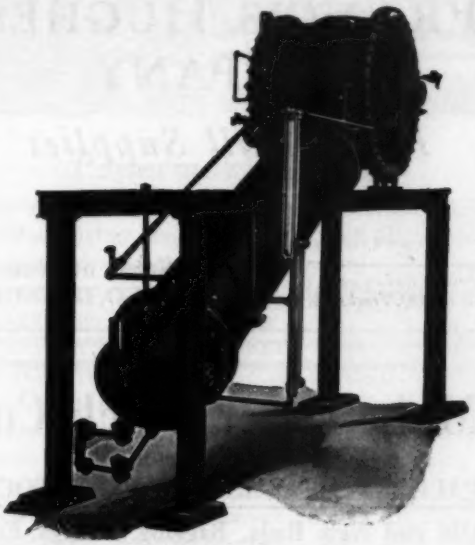
¶ The most powerful clutch built. Vise-like jaws in pairs grip the ring, and are actuated by a powerful toggle mechanism. No springs are used. Clutch is self-centering, and in a friction clutch cut-off coupling no alignment bushing is required, so that when clutch is disengaged there are no revolving parts in contact—therefore, no wear

Send for Catalog

THE HILL CLUTCH CO.

CLEVELAND, OHIO

New York Office: 50 Church Street



"Buflovak" Rapid Circulation Evaporation

"BUFLOVAK" EVAPORATORS

and other apparatus for soda, sulphate and sulphite mills.

Leaching Cells, Causticizers, Digesters, etc. Evaporators built to handle all liquors. Horizontal Tube Evaporators, Vertical Tube Evaporators, Rapid Circulation Evaporators, High Concentrators.

"BUFLOVAK" VACUUM DRYERS

for recovering sulphite waste liquor and other products.

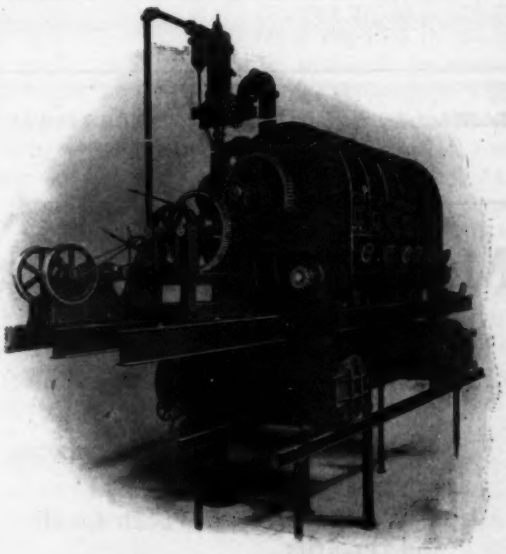
The recovery of sulphite waste liquor from paper mills is one of the important fields developed through the "Buflovak" Vacuum Drum Dryer, which converts the liquor into a dry powdered form at an extremely low cost and yields a handsome profit.

Vacuum Drum Dryers — for drying liquid solutions.

Vacuum Shelf Dryers—for materials that must be handled in pans or trays.

Vacuum Rotary Dryers — for materials that permit agitation or mixing.

Dry Vacuum Pumps, Condensers, Solvent Reclaiming and other Vacuum Apparatus.



"Buflovak" Vacuum Drum Dryer

BUFFALO FOUNDRY & MACHINE CO.

1599 Fillmore Avenue, Buffalo, N.Y.

NEW YORK OFFICE: 17 Battery Place

E. B. THOMAS & CO.
INCORPORATED
ALFRED J. MORAN, Manager
100 Hudson St., NEW YORK
IMPORT EXPORT
HIGH GRADE
Paper Manufacturers' Supplies
RAGS—PAPERSTOCK
ROPE—BAGGING
STRINGS
INQUIRIES INVITED

FRANCIS HUGHES COMPANY
Paper Mill Supplies
CORRESPONDENCE SOLICITED
Private Switch on C. B. & Q. Tracks
21st Street at Loomis
CHICAGO, ILLINOIS

Main Paper Stock Co.
Incorporated
PACKERS OF WASTE PAPER STOCK
Old and New Rags, Bagging, Strings, Etc.
Importers—Exporters
Daily Capacity 300 Tons
Branches:
321 Pearl Street
423 East 122nd St.
General Offices and Warehouses:
25-31 Peck Slip, New York
Boston (Mass.) Office— 10 High St.
Holyoke (Mass.) Office—206 High St.

Established 1885 *LONG DISTANCE PHONES Harrison 5557-2840*
—*To* PAPER Manufacturers
Here is a message of interest for you.
¶ We pack forty different grades of Paper Stock.
¶ Our Daily Capacity is 300,000 pounds.
¶ We can give you both Quality and Quantity.
Send us your inquiries on the grades you want to use in your product.
MENDELSON BROS. PAPER STOCK CO.
General Offices, STANDARD OIL BUILDING
910 South Michigan Boulevard, CHICAGO
"The house with whom you eventually will trade"

DANIEL M. HICKS
(INCORPORATED)
IMPORTERS-DEALERS
ESTABLISHED 1895
"Quality"
140 NASSAU ST. NEW YORK U.S.A.

SCREEN PLATES *and* DANDY ROLLS
Watermarking a Specialty
Central Manufacturing Co.
The Quick Service House
KALAMAZOO MICHIGAN

Papermaking Rags

Papermaking rags have moved in rather restricted quantities during the past month, the decreased demand being due to the fact that many mills covered their requirements for a time through purchases a few weeks ago and also to the steady influx of rags from Europe which has enabled quite a number of paper manufacturers to let up in their buying of domestic material. Enough business has been done, however, to maintain prices, and according to representative rag dealers, present prospects are for another upward spurt in values very soon or when consumers commence to cover their wants for the fall and early winter months. New cuttings are very firmly held by packers, who assert they cannot replace stocks at any lower prices and who anticipate a marked revival of demand within the next several weeks. Neither are old rags being offered at concessions in price, and buyers seeking supplies invariably find it necessary to pay quoted figures to obtain material. Quotations f. o. b. New York follow:

New Stock—	
White shirt cuttings, No. 1	15.00-15.50
White shirt cuttings, No. 2	9.00- 9.25
Fancy shirt cuttings	11.00-11.50
Washables, No. 1	9.25- 9.50
Unbleached muslins	13.00-13.50
White lawns	13.50-14.00
Overall cuttings, blue	11.00-11.50
Black silesias	7.00- 7.25
Old Stock—	
Whites, No. 1 repacked	7.25- 7.50
Whites, No. 2 repacked	5.50- 5.75
Whites, house soiled	4.00- 4.25
Whites, street soiled	3.50- 3.75
Thirds and blues, repacked	4.25- 4.50
Thirds and blues, rough	3.75- 4.00
Black stockings	3.60- 3.80
Lace curtains	7.00- 7.25
Cotton canvas, No. 1	5.00- 5.25
White cotton batting	5.25- 5.50
Roofing, No. 1	2.90- 3.00
Roofing, No. 2	2.80- 2.90

Rope and Bagging

Sales of No. 1 Manila rope have been reported at 6.25 cents a pound at the point of shipment, denoting an advance of about $5 per ton in prices. Demand is active despite the comparatively large receipts of rope from foreign sources. Scrap bagging is moving in restricted volume, but at firm prices. Gunny is quotably steady. Prices f. o. b. New York are:

	New York and Chicago
Gunny, No. 1 domestic	3.50-3.75
Gunny, No. 1 foreign	3.50-3.75
Scrap bagging, No. 1	2.90-3.15
Roofing bagging	2.50-2.60
Wool tares, heavy	3.75-4.00
Wool tares, light	3.50-3.75
Manila rope, No. 1 foreign	6.00-6.25
Manila rope, No. 1 domestic	6.00-6.25
Sisal strings	3.25-3.50
Mixed strings	2.50-2.65

Old Papers

Increased demand, caused by the tightening situation in wood pulp and the heavy consumption by board manufacturers, has promoted further broad advances in waste paper prices, and quotations are now on levels closely approximating the high marks reached during the war period. Consuming mills are actively seeking supplies and dealers seem reluctant to accept orders for large tonnage owing to the growing difficulty in locating fresh supplies in the packing trade, production being seriously hampered by labor conditions. Sales of folded newspapers to box board mills have been reported at $1 to $1.10 per hundred pounds f. o. b. New York, and of No. 1 mixed paper at 90 to 95 cents. White blank news has moved sharply upward in price, sales being recorded at 1.70 to 1.75 cents a pound New York. Shavings are quotably firm, with demand still favoring soft whites, which have sold at 4.50 to 4.75 cents at the shipping point. Books and magazines are strong and urgently sought at a price basis of around 2.65 cents f. o. b. New York for No. 1 heavy book stock. Quotations f. o. b. New York follow:

	New York and Chicago
Hard white shavings, No. 1	5.25-5.50
Hard white shavings, No. 2-3	4.75-5.00
Soft white shavings	4.50-4.75
Colored shavings	1.60-1.80
Heavy book, No. 1	2.60-2.70
Crumpled, No. 1	1.90-2.00
Ledger stock	2.60-2.80
Kraft, No. 1	3.50-3.60
Manilas, No. 1	1.40-1.50
White blank news	1.70-1.75
Overissue news, No. 1	1.30-1.40
Folded news	1.00-1.10
Mill wrappers	1.10-1.15
Box board cuttings	.95-1.00
Mixed paper, No. 1	.90- .95
Common paper	.65- .70

HUGO THUM, Vice-President

F. G. MARQUARDT, President
A. D. LORENZ, Treasurer

CHAS. E. RAND, Secretary

F. G. Marquardt, Inc.

PAPER

and

Paper Makers' Supplies

345 Broadway, New York City

Packing House
ROCKVILLE CENTRE
NEW YORK

Special Attention Called to Our Own Packing and Assortment

(*Continued from page 453*)

Exposition with committee meetings and inspection of the various exhibits of new equipment for the paper industry, some of which will be as follows:

The Valley Iron Works Co. of Appleton, Wis., will have on exhibition the Vesuvius Sulphur Burner, the Valley Laboratory Beater with Drum Washer, and the Valiwaco Centrifugal Pump. The two latter pieces of equipment will be in operation under conditions approximating the actual conditions of service.

The Buffalo Foundry and Machine Co. will have a very extensive exhibit of Buffalovak and Buffalokast products, part of which will consist of Evaporating Equipment in actual operation on substances of particular interest to the paper industry.

The Nash Engineering Co. will have a Nash Hytor Vacuum Pump and Air Compressor, also a Jennings Hytor Dryer Exhaust Unit in operation. Various other units will be on exhibition, but not in operation. The Dryer Exhaust will be the regular unit used in connection with the Paper Machine Dryer systems.

The Du Pont de Nemours Co. will have a very extensive exhibition to cover all their various lines, with particular attention and space to the Dyestuffs branch of their business, which will include all the regular paper pulp colors and some of their latest developments, new shades that are now commercially available.

The U. S. Government will be represented with a large exhibit from the Burau of Agriculture, Bureau of Standards, and the Forest Products Laboratory.

Eimer and Amend, besides a full line of laboratory equipment, will feature a Pulp Balance they have developed that is in every way equal to previous Standards.

American Hard Rubber Co. will show a small hard rubber centrifugal pump in operation, as well as a reciprocating pump and hard rubber screwed pipe.

The Everlasting Valve Co. will display a line of acid proof steel valves and a new development in the valve art known as the Wilson Cup Valve.

Oliver Continuous Filter Co. will exhibit their regular line of filters and the Oliver Sand Table Filter.

Abbe Engineering Co. will have a complete line of Pebble Mills, Rotary Cutters, Vacuum Pumps, Filter Presses, and a Laboratory Pebble Mill particularly adapted for testing out paper pulp samples.

The National Analine & Chemical Co. will have a complete line of dyes.

The Hygeia Respirator Co. will have on exhibition their various types of respirators.

The Barbecue at Watervliet

The celebration of the Watervliet Paper Company on Labor Day proved to be a very successful affair. The people fed at the Barbecue luncheon numbered between fifteen hundred and two thousand. These included the employees, their families and friends, all of the local business men in Watervliet and their families, and also quite a large delegation of friends and stockholders from Kalamazoo and surrounding points. The menu consisted of an ox roasted whole over an open fire, sweet corn on the cob, buns, watermelons, pickles and lemonade.

The entire afternoon was taken up with sports, in which the mill employees and their families took part.

Dance music was furnished in the evening by Shooks' Colored Orchestra from Detroit. This was pronounced by all, the biggest single event ever staged in this particular locality and the perfect weather added to the enjoyment of the day.

A Manufacturer of Paper Mill Machinery

has a position open for a young man in the Sales Department.

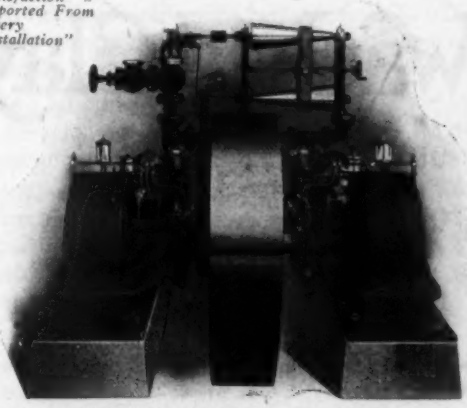
A technical engineering education not necessary, but he should have a sufficient knowledge of paper mill operating conditions, to furnish an intelligent description of a mill's individual needs for the engineers to draw up a set of tentative plans.

A splendid opportunity for a man that will use his head. Salary and expenses. Address giving previous experience.

Machinery, Care of Paper Industry
150 Nassau St., New York

Large, Modern Designed ENGINES

"Perfect Satisfaction Reported From Every Installation"



Economy—Continuity of Performance—Ease of Care and Adjustment—Infrequency of Repairs

These, the important requirements of an engine, are met by "ERIE" double variable speed engines.

To the Paper Mill Trade

We will be glad to furnish full information as to price, delivery and equipment to meet your requirements, and will appreciate an opportunity to furnish these details by mail and the privilege of personal interviews being arranged.

MANUFACTURED BY
ERIE ENGINE WORKS *Established 40 Years* **Erie, Pa.**

Special Sales Representatives
New York—W. B. Connor, Inc., 90 West Street.
Boston—Schumacher-Santry Co., 141 Milk Street.
Chicago—E. E. Maher, 818-819 Michigan Boulevard Building.

Phones 8311 8312 8313 Murray Hill

JOHN ASPEGREN, Pres.
NILS R. JOHANESON, V. Pres. & Gen. Mgr.

SCANDINAVIAN-AMERICAN TRADING COMPANY

50 East 42nd Street
NEW YORK CITY

Importers and Exporters of
CHEMICAL WOOD PULP
of ALL KINDS

Dealers in
Domestic Sulphites, Kraft Pulps
and GROUND WOOD

Agents for PAPER MILL SUPPLIES

J. ANDERSEN & CO.

FREDERICK BERTUCH, SPECIAL PARTNER
21 East 40th Street, New York City

Importers of Chemical Pulps
BLEACHED AND UNBLEACHED

Agents for Kellner Partington Paper Pulp Co., Ltd.
Sarpsborg, Norway; Forshaga, and Edsvalla, Sweden;
Bergvik and Ala Nya Aktiebolag, Söderham, Sweden

PRICE & PIERCE, Ltd.

30 E. 42d Street, New York

Sole Agents

BATHURST LUMBER CO., Ltd.
Bathurst, N. B.

EASY BLEACHING SULPHITE AND KRAFT PULP

Also

ATLANTIC PAPER & PULP CORP.
Savannah, Ga.

KRAFT PULP

Reasons for using our domestic

Washed Clay

QUANTITY: Largest production in United States.

QUALITY: Lowest grit and moisture contents of any clay, domestic or foreign.

DELIVERIES: Reserve stock never under 6000 tons.

PLANTS: Three huge plants at McIntyre, Ga., under direct control of Edgar Bros. Co., also Saylorsburg, Pa., and Gordon, Ga.

CRUDE CLAY: Paragon and Excelsior Brands.

MINER-EDGAR CO.
30 Church St. New York

N.O.C. N.O.C.

NEW YORK OVERSEA CO. INC.

Importers and Exporters of
WOOD PULP and PAPER
Offices located all over the World

New York
Stockholm
Copenhagen
London
Paris
Marseilles
Genoa
San Francisco
Las Palmas
Calcutta
Samarang
Surabaya

Christiania
Teneriffe
Maranham
Rio de Janeiro
Sao Paulo
Buenos Aires
Hong-Kong
Shanghai
Tientsin
Batavia
Durban
Cape Town
Valparaiso

NEW YORK 17 BATTERY PL. U.S.A.

N.O.C. N.O.C.

New Papers

Writing—	
White rag	20-40
White sulphite, No. 1	12-20
Colored	14-23
Ledger—	
White rag	20-42
White sulphite	14-22
Colored sulphite	16-
Colored rag	22-
Bonds—	
White rag	17-47
White sulphite	13-22
Colored sulphite	14-26
Colored rag	17-50
Book—	
No. 1 S. & S. C.	9.00-10.00
Machine finished	8.50- 9.50
English finished	9.00-12.00
Coated and enamel	10.50-14.00
Lithograph, M. F.	8.75-12.00
News Print—	
Rolls, contract	3.75-
Rolls, transient	5.00- 5.50
Sheets	4.75- 5.00
Side runs	4.25- 4.50
Cover Stock—	
Coated, both sides	12.25-.....
Coated, one side	12.00-.....
Wrappings—	
No. 1 kraft	8.50- 9.00
No. 2 kraft	7.50- 8.00

Boards—	New York	Chicago
Solid news	65.00-70.00	55.00-60.00
Straw	55.00-60.00	40.00-45.00
Plain chip	60.00-65.00	50.00-55.00
White coated chip	75.00-80.00	65.00-70.00
Manila coated chip	70.00-75.00	65.00-70.00
Binders board	75.00-80.00	75.00-80.00

Mechanical Pulp

Quotations on mechanically ground wood pulp have advanced during the past month with a rapidity that has surprised even those who had predicted a sharp upturn in prices at about this time. Sales of prime quality pulp have been noted in the East at $35 and $36 per ton at the grinding mills, and offerings by producers even at these prices have been inadequate to cover the demand, with the result that values seem likely to soon go to new high levels. The heavy production of news print paper is mainly responsible for the keen and voluminous demand for mechanical pulp, and with wood supplies light and water conditions becoming increasingly unfavorable, grinders are unable to keep pace in their manufacturing operations to take care of the requirements of consumers.

Chemical Pulp

Strength and activity are the salient characteristics of the market for domestic chemical pulps, and prices on almost every grade have risen during the past several weeks under a brisk buying movement. In fact, demand has assumed such proportions that producers are hardly able to cope with it, and the situation has arrived at a point where consumers are overlooking the matter of price in their anxiety to cover their wants. The great majority of manufacturers of pulp are refusing flatly to enter into engagements for more than a month ahead, and those few who are selling further into the future are said to have contracted for practically their entire output for the balance of the year. Bleached sulphite of standard quality is now very nearly unobtainable at 6 cents per pound, sales of pulp of secondary grade having reported at this price. News print sulphite is in strong demand, and most manufacturers now demand $75 a ton at the pulp mill for spot shipments. Soda pulp is actively sought and higher in price, the revised range of quotations being from 4.75 to 5 cents a pound. Kraft is firm and moving in large volume. Quotations f. o. b. pulp mills follow:

Bleached sulphite	6.00-6.50
Easy bleaching sulphite	4.50-5.00
News grade sulphite	3.50-3.75
Soda pulp, bleached	4.75-5.00
Mitscherlich unbleached	5.25-5.50
Kraft, No. 1	4.25-4.75
Screenings, refined	1.50-1.75

Chemicals

Most kinds of chemicals used by pulp and paper manufacturers are sought in good volume and prices are undergoing a hardening process under the broadening movement of supplies into consuming channels. Not only are domestic consumers buying freely, but demand from export sources is steadily expanding. Prices are:

Alum, lump ammonia	4.25- 4.50
Alum, lump starch	9.00- 9.50
Alum, powdered	4.50- 5.00
Blanc fixe	4.25- 4.50

(Continued on page 473)

The Pulp and Paper Trading Co.

21 East 40th Street New York City

Dealers in Domestic Chemical and Mechanical Pulps and Paper

AGENTS FOR

J. & J. Rogers Company, Au Sable Forks, N. Y.
Canadian Kraft, Ltd.
Dealers in Wayagamack Kraft
Three Rivers, Canada

EASTERN AGENTS FOR

Port Huron, Michigan, Mitscherlich Sulphite
Made by Port Huron Sulphite & Paper Co., Port Huron, Mich.

Wisconsin Wire Works

FOURDRINIER WIRES

and All Meshes of

PAPER MILL WIRE CLOTH

Appleton Wisconsin

James L. Carey

Paper Mill Architect and Engineer

208 N. Laramie Ave., Chicago, Ill.

UNION SCREEN PLATE CO.

Fitchburg, Mass., U. S. A. Lennoxville, P. Q., Canada

UNION BRONZE SCREEN PLATES

(Best phosphorized Cast Metal)

Old Plates RECLOSED and RECUT to accurate gauge
UNION BRONZE SCREWS for Screen Plates
Immediate Delivery of the Largest Orders. Satisfaction Guaranteed

The Witham Screen Plate Fastener, Patented

THE ORIGINAL THE BEST

ROBERT BLANK

Paper Manufacturers' Supplies

New Cuttings *Paper Stock* *Rags*

140 Nassau Street NEW YORK

The Stickle Automatic Steam Control for Paper Machines

WE wish to emphasize the word "automatic." This with us means that the steam follows changes that come to the sheet from free to hard drying stock or any ordinary changes in weights. A control that does not do this in itself is not automatic. This makes a better sheet of paper. We guarantee to hold the moisture at any point you wish with ½ of 1% change. Furnished on 60 days' approval.

OPEN COIL HEATER & PURIFIER CO.

INDIANAPOLIS, IND.

BOSTON PHILADELPHIA

REX Paper Company

Manufacturers of

Coated and OFFSET

Papers

Kalamazoo, Michigan

(*Continued from page 471*)

Bleaching powder (domestic drums)	2.25- 2.50
Brimstone (ton)	20.00-22.00
Casein	15.00-17.00
Caustic soda	3.25- 3.50
China clay, domestic, washed	11.00-13.00
China clay, foreign	15.00-20.00
Rosin, grade E	18.50-
Satin white	2.25- 2.50
Soda ash, 58 per cent light (bags)	1.90- 2.00
Sulphate of alumina, commercial grade	1.80- 2.00
Starch, Globe, in bags	5.87-
Talc (ton)	12.00-15.00

New York News Personals

Charles W. Williams & Company, paper dealers of New York and Chicago, are to shortly open an office in Boston, Mass.

E. H. Gould, for the past twelve years with the National Wax and Parchment Paper Company, of Brooklyn, recently joined the selling staff of the Domestic Mills Paper Company, of 98 Reade street.

Franklin S. Cobb, formerly in the pulp department of Wilkinson Bros. & Co., 419 Broome street, and widely known among paper manufacturers, has gone into business on his own behalf and under his own name, to deal in domestic and foreign wood pulp of all kinds. His office is at 103 Park avenue.

Walter H. Rice has resigned his position in the paper section of W. R. Grace & Co., to become affiliated with the foreign department of Henry Lindenmeyr & Son.

The Main Paper Stock Company, of this city, has established an office at 206 High street, Holyoke, Mass., with Harold W. Ross, formerly of the American Writing Paper Company, in charge.

Alfred J. Moran, general manager of the paper stock department of E. B. Thomas & Co., 100 Hudson street, has been made treasurer of that concern, his election commemorating his third anniversary with the Thomas company.

The Erie Engine Works announce the opening of new Chicago sales offices under the management of E. E. Maher at rooms 818-819 Michigan Boulevard Building, 30 North Michigan Boulevard. Telephones: Randolph 4720-4721.

Mr. Thomas O. Morgan, until recently head of the Service Department of the New York office of the American Steam Conveyor Corporation has been promoted to the position of Sales Engineer. He will handle Long Island and Connecticut territory.

American Printers' Roller Mfg. Co.

316 W. Grand Ave., Chicago, Ill.

ECONOMY & UNIFORMITY of PRODUCT

Printers' Rollers

Are one of the most important tools of production in any pressroom. It is very important that your rollers be able to "stand up" under your conditions in order to enable you to produce GOOD PRINTING ECONOMICALLY.

If you have roller troubles of any description we will gladly prescribe the remedy for them.

ALSO MANUFACTURERS OF

Make-Ready Paste **Goo-Goo Pad Glue**
Liquid Glue **Flexo Padding Glue**

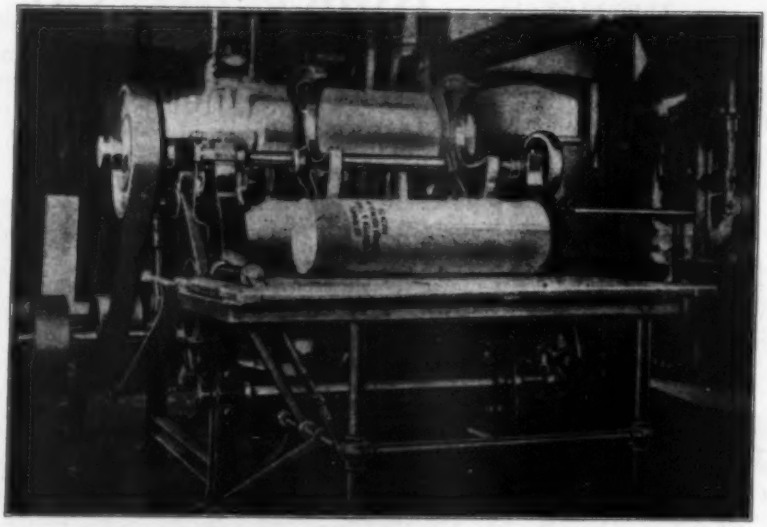
AND A FULL LINE OF THE

Best Grade Pastes, Glues and Adhesives

American Printers' Roller Mfg. Co.

316 W. Grand Ave., Chicago, Ill.

EFFICIENCY IN WRAPPING ROLLS



is only obtainable by the use of the

Power Roll Wrapper

Wraps and stencils Rolls at a saving of from fifty to seventy-five per cent.

Nekoosa Motor & Machine Company

Manufacturers and Sole Agents NEKOOSA, WIS., U.S.A.

WHEN you buy a water heater, or anything else for that matter, you do not actually buy a water heater, but what it will do.

"SIMS" Open Feed Water Heater, Filter and Purifier is the product of Modern Engineering Science and has met the demand for greater efficiency.

OPEN FEED construction is the most simple and effective principle of feed water heating and has less maintenance troubles and operating costs than any other type.

WATER HEATER feeds your boilers with hot water, reduces the strain from contraction and expansion due to feeding cold water and effects a saving of approximately 14.5% in fuel.

FILTER and PURIFIER the feed water in a filtering chamber containing hard coke of suitable size as the filtering medium.

Water containing earthy matter and carbonate of lime when heated close to the boiling point is thrown out of solution into suspension and is removed by the filter.

Is installed you GET the service you bought

Ask us about the "Sims" feed-water heaters.

The "SIMS" Open Feed WATER HEATER, FILTER & PURIFIER

THE SIMS COMPANY

"We Keep Others in Hot Water."

ERIE PENNA.

Chemical Pulp

While manifests of vessels arriving at New York during the past month have shown rather small amounts of chemical wood pulps, it is understood from information secured from local importing firms that receipts at other Atlantic ports have been proportionately larger than those at New York. Most of the supply of foreign pulp now coming in has been bought to arrive and is therefore having little effect on the market situation here. From all reports, it is becoming more and more difficult to purchase pulp in Sweden and Norway, where manufacturers are encountering a very brisk demand from British, Japanese and other buyers, while Finnish producers are said to have disposed of their entire output for the balance of the year. Prices on the other side of the Atlantic are strong and gradually moving upward, as would be expected with virtually the whole world endeavoring to purchase pulp in the Scandinavian countries and with production there substantially under normal. Receipts during the past month and current quotations follow:

Bleached sulphite	$7.50-8.00
Unbleached sulphite, No. 1	5.00-5.25
Easy bleaching	5.50-5.75
Mitscherlich unbleached	5.50-6.00
Kraft	4.50-4.75

Nilsen, Rantoul & Co., 330 bls. sulphite from Christiania.

American Woodpulp Corp., 600 bls. from Gothenburg.

National Bank of Commerce, 3,447 bls. from Gothenburg.

National City Bank, 375 bls. from Gothenburg.

Tidewater Paper Mills, 22,030 bls. ground wood from Liverpool, N. S.

Order, 700 bls. from Copenhagen.

Paper Stock

The past month has witnessed the arrival of largely increased tonnages of papermaking rags at the port of New York from European countries. Some vessels have brought as much as four to five thousand bales and the influx of foreign material has relieved the pinch in domestic supplies to no little extent. The great bulk of rags now coming in are of Holland and French origin, and are of low quality. Nevertheless some material suitable for writing paper manufacture is being received and is finding a ready market among mills in this country. Old rope and bagging imports also have shown an increase. Arrivals within the past month follow:

Rags

Guaranty Trust Co., 207 bls. from Hull.

Kidder, Peabody & Co., 355 bls. from Havre.

E. J. Keller Co., 1,073 bls. from Havre, 33 bls. from Leith.

Mechanics & Metals National Bank, 660 bls. from Havre, 203 bls. from Algiers.

Equitable Trust Co., 1,066 bls. from Havre, 1,321 bls. from Hull, 87 bls. from Leith.

Castle, Gottheil & Overton, 335 bls. from Hull, 1,174 bls. from Rotterdam.

Atterbury Bros., 142 bls. from Hull, 128 bls. from Bordeaux.

P. Bertuch, 2,667 bls. from Hull.

Salomon Bros. & Co., 190 bls. from Rotterdam, 229 bls. from Hull.

Citizens National Bank, 241 bls. from Rotterdam.

Irving National Bank, 310 bls. from Rotterdam.

R. F. Downing & Co., 2,603 bls. from Rotterdam, 218 bls. from London.

International Banking Corp., 125 bls. from Rotterdam.

Bank of New York, 841 bls. from Rotterdam.

Certain-Teed Products Corp., 147 bls. from London, 95 bls. from Antwerp.

A. Salomon, Inc., 1,303 bls. from Bordeaux, 551 bls. from Havre.

Edwin Butterworth & Co., 58 bls. from Bordeaux.

Jebb Bros., 536 bls. from Havre.

Brown Bros. & Co., 100 bls. from Havre, 657 bls. from Antwerp.

National City Bank, 170 bls. from Havre.

Wilkinson Bros. & Co., 865 bls. from Havre.

R. Goldstein & Son, 115 bls. from Havre.

Order, 184 bls. from Rotterdam, 166 bls. from London, 62 bls. from Leith.

Old Rope

Equitable Trust Co., 231 bls. from Havre.

Kidder, Peabody & Co., 395 bls. from Havre.

I. & J. Hyman, 105 bls. from London.

Brown Bros. & Co., 125 coils from Hull, 451 coils from Bristol.

Irving National Bank, 88 coils from Leith.

Old Colony Trust Co., 80 coils from Leith.

Castle, Gottheil & Overton, 170 coils from London.

International Purchasing Co., 176 coils from Hull, 176 coils from Havre.

W. Schall & Co., 391 coils from Hull.

(Continued on page 477)

DON'T WASTE

Your Power by the Ton with the Ordinary Beating Engine. Install an UMPHERSTON BEATER and Save Power on Every Pound of Stock.

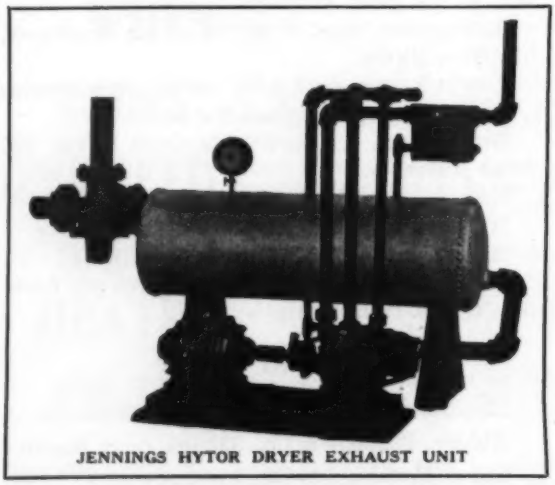
"We build our machinery to meet your requirements"

Improved Type of Umpherston Beater

Information and Booklets describing our Specialties sent to you on request

HOLYOKE MACHINE COMPANY, Holyoke, Mass.

SOME OF THE "HOLYOKE" SPECIALTIES—Chilled Iron Rolls, Cotton Rolls, Paper Rolls, Wood Pulp Grinders, Wood Barkers, Wood Chippers, "Umpherston" Beaters, Rag and Paper Dusters, Washing and Beating Engines, Reeling Machines, Hydraulic Pumps, Hydraulic Presses, Coated Paper Strainers, Turbine Wheels, Gearing and Shafting, Calendars, Platers, Rag Cutters.



JENNINGS HYTOR DRYER EXHAUST UNIT

TAPPI

Convention, Chicago, Sept. 24-27—

Attention Members: You are cordially invited to inspect the

Nash Hytor Vacuum Pumps

AND THE

Jennings Hytor Dryer Exhaust Units

In operation at Booths Nos. 55 and 56, Coliseum, during the Exposition of Chemical Industries beginning the week of September 22nd

A Cordial Welcome is Assured You

Thomas H. Savery, Jr., Representative Pulp and Paper Industry
1718 Republic Building CHICAGO, ILLINOIS

(Continued from page 475)

Edwin Butterworth & Co., 76 coils from Hull, 227 coils from Havre.

Citizens National Bank, 392 coils from Hull.

Order, 20 bls. from London.

Miscellaneous Paper Stock

Castle, Gottheil & Overton, 637 bls. from Rotterdam, 73 bls. from Hull, 1,684 bls. from Havre, 37 bls. from Glasgow, 926 bls. from Antwerp.

Guaranty Trust Co., 365 bls. from Rotterdam, 130 bls. from Liverpool.

Union Commerce National Bank, 4,432 bls. from Rotterdam.

Irving National Bank, 721 bls. from Rotterdam.

Brown Bros. & Co., 332 bls. from Rotterdam, 131 bls. from Hull.

Equitable Trust Co., 175 bls. from Rotterdam, 1,233 bls. from Hull.

Maurice O'Mears Co., 239 bls. from Liverpool.

Edwin Butterworth & Co., 73 bls. from Hull.

National City Bank, 165 bls. from Hull, 318 bls. from Havre.

Goldman, Sachs & Co., 50 bls. from Hull.

Kidder, Peabody & Co., 470 bls. from Hull.

A. Salomon, Inc., 279 bls. from Hull, 618 bls. from Antwerp.

Order, 13 bls. from Glasgow.

Paper

Importations of paper at the port of New York have been light during the past month. In fact, aside from French cigeratte paper and special designs of hanging paper, arrivals have been of negligible quantity, which can be taken to indicate that American consumers are looking to domestic mills to fill their wants rather than placing orders abroad. Imports of cigarette paper at this port during the past month have approximated 2,500 cases, which is close to average import figures for this kind of paper.

Foreign Trade Opportunities

A firm of publishers in Spain desires to receive samples of paper from American firms similar to that which has been forwarded and may be seen at the bureau or its district offices. (Refer to file No. 20685.) Quotations should be given c. i. f. or f. o. b. and full information as to prices, discounts, etc., submitted. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 29,925.

A commercial agent from Norway, who is in the United States, desires to secure agencies for the sale in his country of woolen felts for the paper industry. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 29,872.

UNLOADING PULPWOOD

Handle Your Coal and Pulpwood Mechanically with a Byers Auto-Crane

¶ The rising cost of common labor has caused a large number of paper mills to look for labor-saving devices, and the Auto-Crane has answered the call.

¶ Not confined to tracks, and can go anywhere about your yards. Steam, gasoline or electric power.

Ask for Bulletin 1016

The

John F. Byers Machine Company

311 Sycamore St., RAVENNA, OHIO

UNLOADING COAL

BERMINGHAM
& PROSSER CO.
— Kalamazoo, Michigan —

PAPER
Distributors

Let us submit an estimate on your next

Catalog
Booklet
Broadside
or Magazine

MAKE THE HANDLING OF

Parchment
Profitable to You

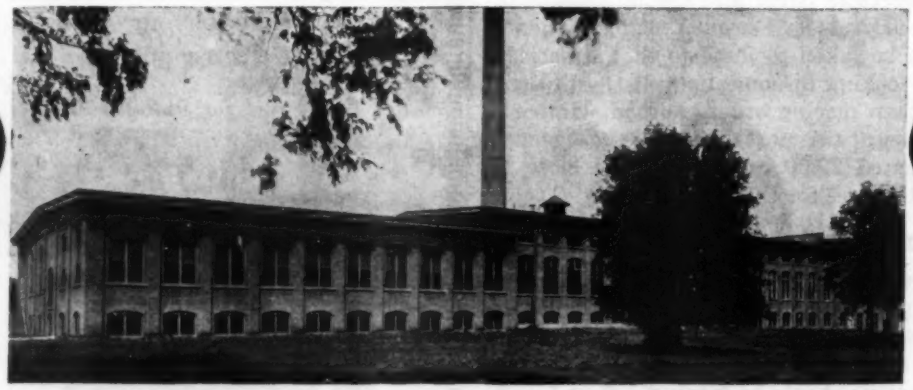
¶We have prepared Samples, put up in neat cartons, for the Jobbing Trade.

¶If you have not received a set we will gladly send one.

ALSO
Special Price Lists
FOR YOUR SALESMEN

SUTHERLAND PAPER CO.
Makers of
Pure Vegetable Parchment
KALAMAZOO MICHIGAN

The Symbol of Quality



The Symbol of Quality

LAKESIDE PAPER COMPANY

NEENAH, WISCONSIN

"Our name stands for Quality"

We are manufacturers of Bonds, Bible, Book, Catalogue, Eggshell, English Finish Opacity, M. F. and S. & S. C. French, Myriad Manifold, Tiffany Bond, Glazed, Unglazed, and Embossed, Gaza Onionskin, R. R. Writing, Writing Manila, High Cliff Mimeograph, White and Colored Laid Flats. Also other light and heavy weight M. F. and S. & S. C. specialties.

Quality
and
Service

From a Jobber:

"We are enclosing an order for two additional cars and think it would be well to add that your paper has been running very satisfactory and that it will probably be some little satisfaction to you to know that we are thoroughly satisfied with this sheet and think it well to give you a word of praise."

THE PRODUCTS OF INDIVIDUALITY

Buyers' Guide—What and Where to Buy

Equipment, Apparatus, Supplies and Raw Materials Used by the Paper Industry

ADHESIVES
The A .P. R. Mfg. Co., 316 West Grand Ave., Chicago.
AGITATOR EQUIPMENT
The Hill Clutch Co., Cleveland, Ohio.
AIR CONDITIONING AND CONTROL APPARATUS
Bayley Mfg. Co., 732 Greenbush St., Milwaukee, Wis.
ANGLE VALES
The Crane Company, Chicago, Ill.
ARCHITECTS
James L. Carey, 208 N. Laramie St., Chicago.
ASSORTING TABLES
Moore and White Co., Philadelphia, Pa.
ASH CONVEYOR SYSTEMS
American Steam Conveyor Corp., Chicago, Ill.
BARKERS
Holyoke Machine Co., Holyoke, Mass.
Valley Iron Works Co., Appleton, Wis.
BARKING DRUMS
H. O. Numan, Green Bay, Wis.
BEATER BARS
John W. Bolton & Sons, Inc., Lawrence, Mass.
R. J. Dowd Knife Works, Beloit, Wis.
BEATER BED PLATES
John W. Bolton & Sons, Inc., Lawrence, Mass.
BEATER ROLL FILLING
R. J. Dowd Knife Works, Beloit, Wis.
BEATING, WASHING AND BLEACHING ENGINES
Holyoke Machine Co., Holyoke, Mass.
Valley Iron Works Co., Appleton, Wis.
BEATERS (Continuous)
Claflin Engineering Co., Lancaster, Ohio.
BELTING (Rubber)
United States Rubber Co., New York and Chicago
BELT DRIVES
The Hill Clutch Co., Cleveland, Ohio.
BLEACHING (Propellers)
Moore and White Co., Philadelphia, Pa.
BLOWERS
Buffalo Steam Pump Co., Buffalo, N. Y.
BOARDS (Straw)
The C. L. La Boiteaux Co., Cincinnati, O.
BRASS WIRE CLOTH
Appleton Wire Works, Appleton, Wis.
Lindsay Wire Weaving Co., Cleveland, Ohio.
Wisconsin Wire Works, Appleton, Wis.
BRONZE JACKETS
Sandusky Foundry & Machine Co., Sandusky, Ohio.
BUNDLING SYSTEMS
Signode System, Lake St., Chicago
CALENDERS
Holyoke Machine Co., Holyoke, Mass.
CALENDER DOCTORS
Ticonderoga Machine Works, Ticonderoga, N.Y.
CALENDER ROLLS
Holyoke Machine Co., Holyoke, Mass.
B. F. Perkins and Son, Inc., Holyoke, Mass.
CENTRIFUGAL PUMPS
American Steam Pump Co., Battle Creek, Mich.
Buffalo Steam Pump Co., Buffalo, N. Y.
Valley Iron Works Co., Appleton, Wis.
CHIPPERS
Holyoke Machine Co., Holyoke, Mass.
Valley Iron Works Co., Appleton, Wis.
CHIPPER AND BARKER KNIVES
L. & I. J. White Co., 85 Columbia St., Buffalo, N. Y.
Simonds Manufacturing Co., Fitchburg, Mass.
CLAYS AND FILLERS
Miner-Edgar Co., 30 Church St., New York City.
The John W. Higman Co., Inc., 29 Broadway, New York City.
Daniel M. Hicks, 140 Nassau St., New York City.
COAL BUNKERS
The Brownhoist Co., Cleveland, Ohio.
CRANES
Northern Engineering Works, Detroit, Mich.
The Brownhoist Co., Cleveland, Ohio.
John F. Byers Co., Ravenna, Ohio.
DANDY ROLLS
Appleton Wire Works, Appleton, Wis.
Central Mfg. Co., Kalamazoo, Mich.
Lindsay Wire Weaving Co., Cleveland, Ohio.
Wisconsin Wire Works, Appleton, Wis.
DECKEL FRAME SUPPORTS
Huband and Nash, Menasha, Wis.
DRUM WINDERS
Ticonderoga Machine Co., Ticonderoga, N. Y.
DRYER FELTS
Shuler and Benninghofen, Hamilton, Ohio.
DYESTUFFS
E. I. Du Pont de Nemours & Co., Wilmington, Del.
Binney & Smith, 81-83 Fulton St., N. Y. City.
ELECTRIC FANS
B. F. Perkins and Sons, Inc., Holyoke, Mass.
ELECTRIC HOISTS
Northern Engineering Co., Detroit, Mich.
John F. Byers Machine Co., Ravenna, Ohio.
ELEVATING TRUCKS
Economy Engineering Co., Chicago, Ill.
Moore and White, Philadelphia, Pa.
ENGINES
Chandler and Taylor, Indianapolis, Ind.
Erie Engine Works, Erie, Pa.
Hooven, Owens, Rentschler Co., Hamilton, Ohio.
ENGINEERS
James L. Carey, 208 North Laramie St., Chicago, Ill.
EVAPORATORS:
Buffalo Foundry & Machine Co., Buffalo, N. Y.
FASTENERS (Screen Plate)
Union Screen Plate Co., Fitchburg, Mass.
FELTS AND JACKETS
Shuler and Benninghofen, Hamilton, Ohio.
FELT AND WIRE GUIDES
Huband and Nash, Menasha, Wis.
Moore & White Co., Philadelphia, Pa.
FOURDRINIER WIRES
Appleton Wire Works, Appleton, Wis.
Lindsay Wire Weaving Co., Cleveland, Ohio.
Wisconsin Wire Works, Appleton, Wis.
FIBRE MAKING PROCESSES
Hall, Ward & Walker, Inc., Sherman Bldg., Watertown, N. Y.
FILTER (Continuous Suction)
Green Bay Foundry & Machine Co., Green Bay, Wis.
FRICTION CLUTCHES
The Hill Clutch Co., Cleveland, Ohio.
Moore and White Co., Philadelphia, Pa.
GRINDERS
Holyoke Machine Co., Holyoke, Mass.
HOISTS
Northern Engineering Co., Detroit, Mich.
John F. Byers Machine Co., Ravenna, Ohio.
HYDRAULIC TURBINES
James Leffel and Co., Springfield, Ohio.
Holyoke Machine Co., Holyoke, Mass.
KNIVES
R. J. Dowd Knife Works, Beloit, Wis.
John W. Bolton & Sons, Inc., Lawrence, Mass.
Simonds Manufacturing Co., Fitchburg, Mass.
LAYBOYS
Moore and White Co., Philadelphia, Pa.
LIFTS
Economy Engineering Co., Chicago, Ill.
LINE SHAFT BEARINGS
The Hill Clutch Co., Cleveland, Ohio.
MACHINE DRYER TEMP. CONTROL
Open Coil Heater and Purifier Co., Indianapolis, Ind.
PAPER BOARDS
F. D. Wilson, 1520 Lumber Exchange Building, Chicago, Ill.
The C. L. La Boiteaux Co., 200 Fifth Ave., N. Y.
PAPER DISTRIBUTORS
Bermingham and Prosser, Chicago, Ill.
Seaman Paper Co., Chicago, Ill.
PAPER EXPORTERS:
Storm & Bull, 2 Rector St., New York City.
PAPER MANUFACTURERS
Bardeen Paper Co., Otsego, Mich.
Bryant Paper Co., Kalamazoo, Mich.
Lakeside Paper Co., Neenah, Wis.
Rex Paper Co., Kalamazoo, Mich.
Monarch Paper Co., Kalamazoo, Mich.
Munising Paper Co., Munising, Mich.
Northern Paper Mills, Green Bay, Wis.
Ticonderoga Pulp & Paper Co., 200 Fifth Ave., New York City.
Watervliet Paper Co., Watervliet, Mich.
Wausau Sulphate Fibre Co., Mosinee, Wis.
Wheat Paper Co., Elkhart, Ind.
Wolverine Paper Co., Otsego, Mich.
PAPER MANUFACTURERS' SUPPLIES
Robert Blank, 140 Nassau St., New York City.
E. B. Thomas & Co., Inc., 100 Hudson St., New York City.
J. Andersen & Co., 21 East 40th St., New York City.
New York Overseas Co., Inc., 17 Battery Place, New York City.
Francis Hughes Co., 21st St. and Loomis Ave., Chicago.
Mendelson Bros. Paper Stock Co., 910 Michigan Ave., Chicago.
Main Paper Stock Co., 25-31 Peck Slip, New York City.
Gatti-McQuade Co., 200 Rifth Ave., New York City.
PARCHMENT MANUFACTURERS
Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
Sutherland Paper Co., Kalamazoo, Mich.
PAPER TESTERS
B. F. Perkins and Son, Inc., Holyoke, Mass.
POWER TRANSMISSION
The Hill Clutch Co., Cleveland, Ohio.
PRINTERS' ROLLERS
American Printers' Roller Co., 316 West Grand Ave., Chicago, Ill.
PULP (Chemical)
The Pulp & Paper Trading Co., 21 East 40th St., New York City.
Eastern Manufacturing Co., 501 Fifth Ave., New York City.
Price & Pierce, Ltd., 30 East 42nd St., New York City.
J. Andersen & Co., 21 East 40th St., New York City.
New York Overseas Co., Inc., 17 Battery Place, New York City.
Scandinavian-American Trading Co., 50 East 42d St., New York City.
Daniel M. Hicks, 140 Nassau St., New York City.
PULP WASHERS
The Green Bay Foundry and Machine Co., Green Bay, Wis.
PUMPS (Paper)
Buffalo Steam Pump Co., Buffalo, N. Y.
PUMPS (Vacuum)
American Steam Pump Co., Battle Creek, Mich.
Buffalo Foundry and Machine Co., Buffalo, N. Y.
Thos. H. Savery, Republic Bldg., Chicago, Ill.
RAG AND PAPER DUSTERS
Holyoke Machine Co., Holyoke, Mass.
Valley Iron Works, Appleton, Wis.
RUBBER ROLLS
United States Rubber Co., New York and Chicago
ROLL WRAPPING MACHINES:
Nekoosa Motor & Machine Co., Nekoosa, Wis.
ROTARY SCREEN
Thos. H. Savery, Republic Bldg., Chicago, Ill.
SAVE-ALLS
The Green Bay Foundry and Machine Co., Green Bay, Wis.
SAWS
Simonds Manufacturing Co. Fitchburg, Mass.
SCREEN PLATES
Union Screen Plate Co., Fitchburg, Mass.
Central Mfg. Co., Kalamazoo, Mich.
SHOWER PIPES
Sandusky Foundry and Machine Co., Sandusky, Ohio.
SPEED CHANGES
Moore and White Co., Philadelphia, Pa.
STEAM JET CONVEYORS
American Steam Conveyor Corp., Chicago, Ill.
STOCK CIRCULATING SYSTEM
Ticonderoga Machine Works, Ticonderoga, N. Y.
Claflin Engineering Co., Lancaster, Ohio.
STOCK PUMPS
Buffalo Steam Pump Co., Buffalo, N. Y.
STOCK SHREDDER
The Green Bay Foundry and Machine Co., Green Bay, Wis.
SUCTION ROLLS
Sandusky Foundry and Machine Co., Sandusky, Ohio.
SULPHUR BURNERS
Valley Iron Works Co., Appleton, Wis.
TIERING MACHINES
Economy Engineering Co., Chicago, Ill.
TURBINES (Water)
James Leffel and Co., Springfield, Ohio.
VACUUM SYSTEMS
Open Coil Heater and Purifier Co., Indianapolis, Ind.
VALVES
The Crane Co., Chicago, Ill.
VARIABLE SPEED ENGINES
Chandler and Taylor, Indianapolis, Ind.
Erie Engine Works, Erie, Pa.
Hooven, Owens, Rentschler Co., Hamilton, O.
VENTILATING SYSTEMS
Bayley Mfg. Co., 732 Greenbush St., Milwaukee, Wis.
Buffalo Steam Pump Co., Buffalo, N. Y.
B. F. Perkins and Son, Inc., Holyoke, Mass.
WASTE PAPER STOCK
Robert Blank, 140 Nassau St., New York City.
E. B. Thomas & Co., Inc., 100 Hudson St., New York City.
Gatti-McQuade Co., 200 Fifth Avenue, New York City.
F. G. Marquardt, Inc., 345 Broadway, N. Y. C.
WATER FILTER
The Green Bay Foundry and Machine Co., Green Bay, Wis.
WATER HEATERS:
The Sims Co., Erie, Pa.
WATER-SOFTENING AND PURIFYING SYSTEMS
Wm. Graver Tank Works, East Chicago, Ind.
Wm. B. Scaife and Sons Co., Oakmont, Pa.
WATER WHEELS
James Leffel and Co., Springfield, Ohio.
Holyoke Machine Co., Holyoke, Mass.
WET MACHINES
Valley Iron Works Co., Appleton, Wis.

DOWD PRODUCTS
for Paper Mills

The name *DOWD* stands for quality—first, last and all the time. A worth-while name to look for.

MANUFACTURERS OF

Beater Bars, Bed Plates, Rag Knives, Paper Cutting Knives, Barker Knives, Chipper Knives, etc., etc.

Write *DOWD* of Beloit on your cutting problems and profit by a very valuable experience.

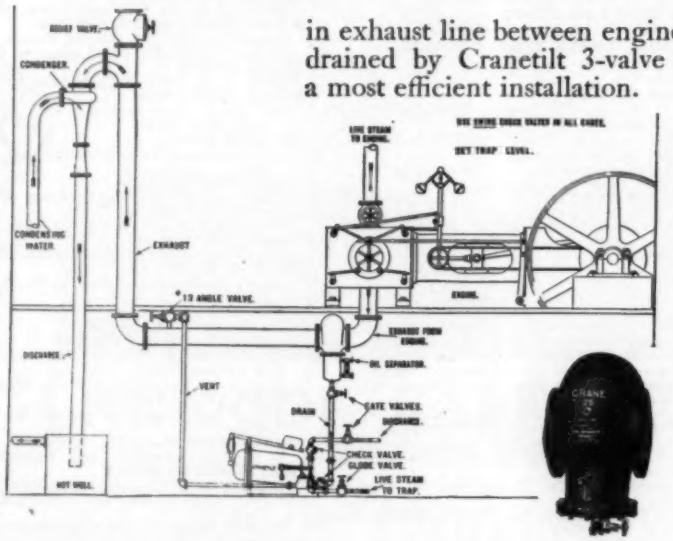
R. J. DOWD KNIFE WORKS

Makers of Better Cutting Knives Since 1847

Beloit, Wisconsin

Agents for Canada:
PULP & PAPER MILL ACCESSORIES, LTD.,
SHAUGHNESSY BLDG., MONTREAL, CANADA

CRANE OIL SEPARATOR



in exhaust line between engine and condenser drained by Cranetilt 3-valve vacuum trap is a most efficient installation.

These Separators have large areas and ample baffle surfaces, affording the highest degree of efficiency with the slightest loss in pressure.

Sales Offices, Warehouses and Showrooms:

Boston, Springfield, Bridgeport, New York, Brooklyn, Philadelphia, Newark, Camden, Baltimore, Washington, Syracuse, Buffalo, Savannah, Atlanta, Knoxville, Birmingham, Memphis, Little Rock, Muskogee, Tulsa, Oklahoma City, Wichita, St. Louis, Kansas City, Terre Haute, Cincinnati, Indianapolis

FOUNDED BY R. T. CRANE, 1855

CRANE CO.
836 S. MICHIGAN AVE.
CHICAGO

Works: Chicago and Bridgeport

Detroit, Chicago, Rockford, Grand Rapids, Davenport, Des Moines, Omaha, Sioux City, St. Paul, Minneapolis, Duluth, Fargo, Watertown, Aberdeen, Great Falls, Spokane, Seattle, Tacoma, Portland, Pocatello, Salt Lake City, Ogden, Sacramento, Oakland, San Francisco, Los Angeles

Alphabetical Index to Our Advertisers

When writing them, please mention The Paper Industry

A

PAGE

American Printers' Roller Mfg. Co., 316 W. Grand Ave., Chicago 473
American Steam Conveyor Corp., Chicago, Ill..... 451
American Steam Pump Co., Battle Creek, Mich..... 461
Andersen & Co., J., 21 E. 40th St., N. Y. C..... 470
Appleton Wire Works, Appleton, Wis..... 410

B

Bardeen Paper Co., Otsego, Mich..... 464
Bayley Mfg. Co., 732 Greenbush St., Milwaukee, Wis.... 455
Bermingham & Prosser, Kalamazoo, Mich..... 478
Binney & Smith Co., 81-83 Fulton St., New York City.. 457
Blank, Robert, 140 Nassau St., New York City..... 472
Brown Hoisting Machinery Co., Cleveland, Ohio..... 456
Bryant Paper Co., Kalamazoo, Mich..... 412
Bolton, John W. & Son, Lawrence, Mass..... 460
Buffalo Steam Pump Co., Buffalo, N. Y..... 405
Buffalo Foundry & Machine Co., Buffalo, N. Y..... 465
Byers Machine Co., John F., Ravenna, O..... 477

C

Carey, James L., 208 N. Laramie St., Chicago, Ill..... 472
Central Manufacturing Co., Kalamazoo, Mich..... 466
Chandler & Taylor, Indianapolis, Ind..... 459
Claflin Engineering Co., Lancaster, Ohio..... 416
Crane Company, The, Chicago, Ill..... 480

D

Dowd Knife Works, R. J., The, Beloit, Wis..... 480
Du Pont de Nemours & Co., Wilmington, Del..... 409

E

Eastern Manufacturing Co., 501 Fifth Ave., N. Y. C.... 453
Economy Engineering Co., The, Chicago, Ill..... 460
Erie Engine Works, Erie, Pa..... 469

G

Gatti-McQuade Co., 200 Fifth Ave., New York City.... 464
Graver Tank Works, East Chicago, Ind..... 407
Green Bay Foundry & Machine Works, The, Green Bay, Wisconsin .....Inside Front Cover

H

Hall, Ward & Walker, Sherman Bldg., Watertown, N. Y. 463
Hicks, Daniel M., 140 Nassau St., New York City..... 466
Hill Clutch Co., Cleveland, Ohio..... 464
Higman, The John W., Co., Inc., 29 Broadway, N. Y. C... 468
Holyoke Machine Co., Holyoke, Mass..... 476
Hooven, Owens, Rentschler Co., Hamilton, Ohio..... 417
Husband & Nash, Menasha, Wis.....Back Inside Cover
Hughes Co., Francis, 21st and Loomis Sts., Chicago..... 466

K

Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich. 457

L

PAGE

La Boiteaux, The C. L., Co., Cincinnati, Ohio..... 459
Lakeside Paper Co., Neenah, Wis..... 478
Leffel and Company, James, Springfield, Ohio..... 453
Lindsay Wire Weaving Co., The, Cleveland, Ohio..... 455

M

Main Paper Stock Co., 25-31 Peck Slip, N. Y. C..... 466
Marquardt, Inc., F. G., 345 Broadway, N. Y. C..... 468
Mendelson Bros. Paper Stock Co., 910 Michigan Blvd., Chicago 466
Miner-Edgar Co., 30 Church St., N. Y. C..... 470
Monarch Paper Co., Kalamazoo, Mich..... 463
Moore & White Co., Philadelphia, Pa..... 403
Munising Paper Co., Munising, Mich..... 414

N

Nekoosa Motor & Machine Co., Nekoosa, Wis..... 474
New York Overseas Co., 17 Battery Place, N. Y. C..... 470
Northern Engineering Works, Detroit, Mich..... 460
Northern Paper Mills, Green Bay, Wis..... 416
Numan, H. O., Green Bay, Wis..... 463

O

Open Coil Heater and Purifier Co., Indianapolis, Ind.... 472

P

Perkins & Son, Inc., B. F., Holyoke, Mass..... 459
Pulp & Paper Trading Co., 21 E. 40th St., N. Y. C..... .....472 and Inside Back Cover
Price & Pierce, 30 E. 42d St., N. Y. C..... 470

R

Rex Paper Co., Kalamazoo, Mich..... 472

S

Sandusky Foundry & Machine Co., Sandusky, Ohio..... 482
Savery, Thos. H., Republic Bldg., Chicago, Ill..... 476
Scaife and Sons Co., Wm. B., Oakmont, Pa..... 457
Scandinavian American Trading Co., 50 E. 42nd St., N. Y. C..... 470
Seaman Paper Co., Chicago, Ill..... 408
Shuler & Benninghofen, Hamilton, Ohio..... 461
Signode System, Chicago, Ill..... 461
Sims Co., The, Erie, Pa..... 474
Simonds Manufacturing Co., Fitchburg, Mass....Front Cover
Storm & Bull, 2 Rector St., N. Y. C..... 457
Sutherland Paper Co., Kalamazoo, Mich..... 478

T

Ticonderoga Machine Works, Ticonderoga, N. Y..... 463
Thomas, E. B., Co., New York City..... 466

U

Union Screen Plate Co., Fitchburg, Mass..... 472
United States Rubber Co., New York..... 414

V

Valley Iron Works Co., Appleton, Wis.....Back Cover

W

Watervliet Paper Co., Watervliet, Mich..... 406
Wausau Sulphate Fibre Co., Mosinee, Wis..... 458
White Co., L. & I. J., 85 Columbia St., Buffalo, N. Y... 459
Widney Co., The, Chicago, Ill..... 462
Wilson, F. D., 1520 Lumber Exchange Bldg., Chicago, Ill. 482
Wisconsin Wire Works, Appleton, Wis..... 472
Wolverine Paper Co., Otsego, Mich..... 461

300

DAILY CAPACITY IN TONS

Standard Grades of Paper Boards

MANUFACTURED BY

ALTON BOX BOARD & PAPER COMPANY

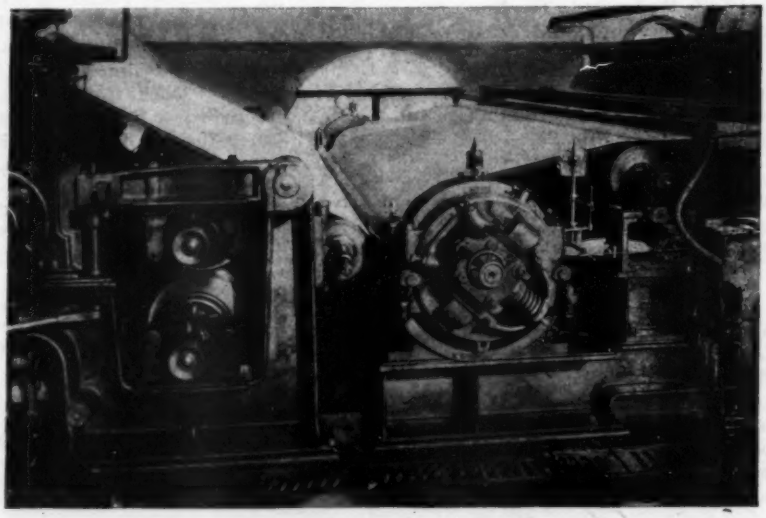
CHICAGO COATED BOARD COMPANY

SALES DEPARTMENT
Office: 1520 Lumber Exchange Building
CHICAGO, ILL.

F. D. WILSON, Sales Manager
Address all communications regarding sales to this office

OF COURSE you can run without Suction Rolls on your machines. Some mills are still doing this, but such a list if compiled, would not include mills like—

Hammermill Paper Company
Wausau Sulphate Fibre Company
Crocker, Burbank & Company
West Virginia Pulp & Paper Company



A RECENT SUCTION COUCH ROLL INSTALLATION

and many other representative mills, some of whom are using as many as 23 Suction Rolls

SEND FOR PARTICULARS

THE SANDUSKY FOUNDRY & MACHINE CO., Sandusky, Ohio